American Artisan and Hardware Record

Sheet Metal - Roofing - Warm Air Furnaces - Stoves

Vol. 91, No. 18 | CHICAGO, MAY 1, 1926 | $2.00 Per Year

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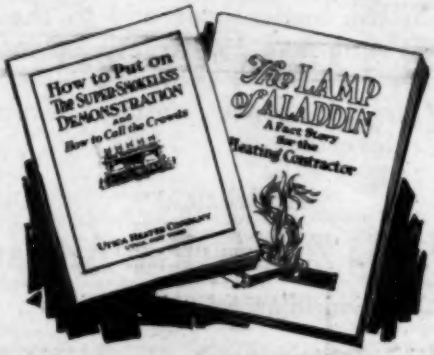

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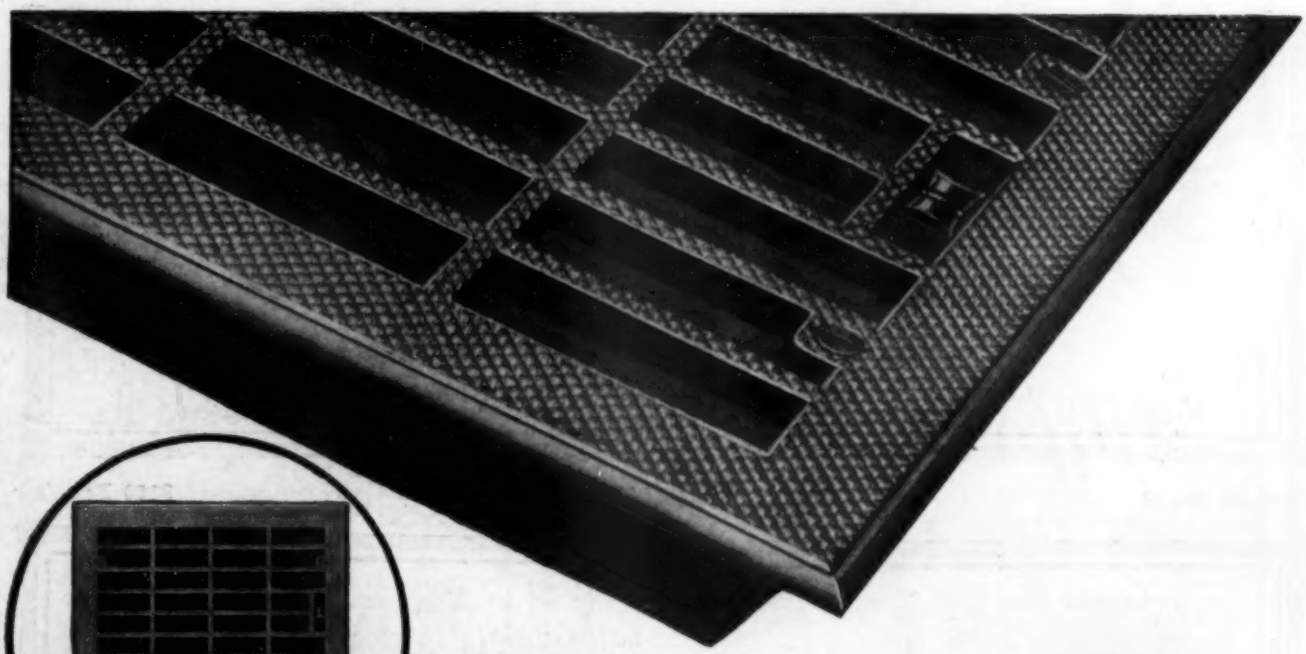

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Table of Contents

AN ACHIEVEMENT

An explanatory note regarding service to readers of AMERICAN ARTISAN. *This paper is now nearing the completion of a half century of service. For almost fifty years it has catered to the needs of the men in the industries which it represents. At no time during its long and successful career has* AMERICAN ARTISAN *been in a better position to render complete, adequate service to its readers than it is today. In addition to the matter contained in our regular weekly publication, we maintain Service Departments for the use of our readers. If you have a problem to solve, we courteously invite you to submit it to us for solution. In what better way can we learn of your problems than from you direct?*

The Convention
of
The National Association of Sheet Metal Contractors

Louisville, Kentucky, May 24 to 28

will be reported (as usual) in full detail in AMERICAN ARTISAN issue of

May 29th

This Convention promises to be one of the most valuable and best attended National Sheet Metal Conventions on record.

The story of this Convention will be of special interest to every live sheet metal contractor and warm air furnace dealer in the country and they will look to AMERICAN ARTISAN for the earliest and most complete report.

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American Artisan and Hardware Record

Vol. 91. CHICAGO, MAY 1, 1926 No. 18.

Copper Roof Gives Quarter Century Uninterrupted Service

By George J. Duerr

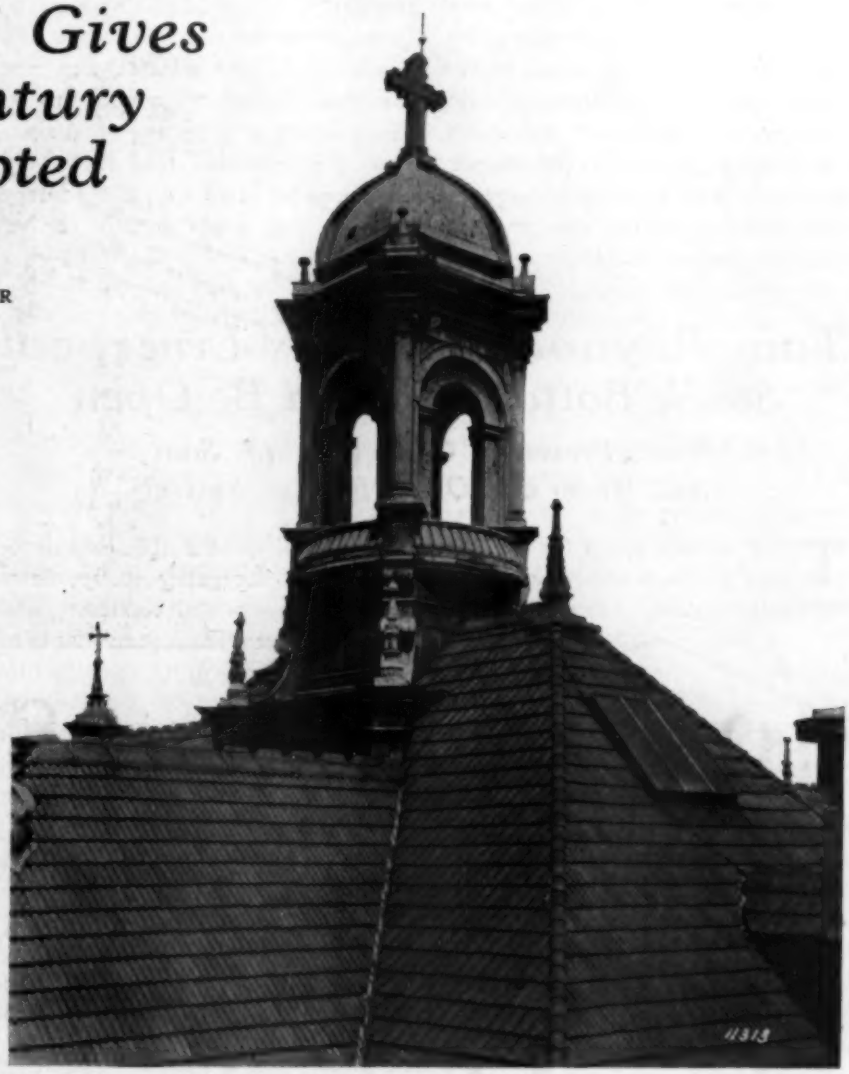
THE Illinois State Fire Marshall has stated this week that the fire loss for the first three months of 1926 is $9,387,930. During the month of March alone the fire loss caused by sparks falling on roofs made of combustible materials ran considerably over the $150,000 mark. The defective flue and chimney was responsible for approximately another $150,000 loss.

These figures, particularly those concerning the losses caused by sparks falling on the roof, tell the story of destruction that is constantly going on.

But to the sheet metal contractor they do more than tell a tale of woe. They provide for him an excellent sales story which he can use to convince prospects of the superiority of the sheet metal roof—either sheet steel, sheet copper or sheet zinc.

The customer immediately goes to work and compares prices. He tells that the original cost of other roofing is less than sheet metal. The labor costs of putting a sheet metal roof on are greater. He is building for quick sale and, therefore, has no interest in permanence of construction.

You wait patiently until he has exhausted every possible argument against the sheet metal roof in favor of the cheaper material. You then come forward and present the monthly fire loss of your state, showing just what chances he is running of losing his property because of the combustible material he has used.



Tower of St. Francis Hospital, Peoria, Illinois, Dome of Which Is Roofed with 16-Ounce Copper

You then show Mr. Prospect how much higher his insurance premium is with the cheap roofing material than with the sheet metal roof. If the building is a farm structure, in all probability you would stress the fact that with sheet metal no lightning rods are necessary as the roof itself and conductor pipe provide a path on which the electrical discharge is carried harmlessly off to the ground.

After this had been allowed to penetrate, the fact that no repairs are necessary on a sheet metal roof; whereas, with other types of roofing the repair expense mounts to a considerable item before the roof must be replaced.

The cheaper roofing materials are entirely out of the class of sheet metal. They cannot compete successfully with sheet metal either in service or in ultimate cost.

This fact is very forcibly brought out in the accompanying illustration.

This is a photograph of the elegant copper covered tower, which tops the St. Francis Hospital at Peoria, Illinois. The structure was erected by the Peoria Stone and Marble Company.

It was completed in 1902, at which time the tower dome was covered with 16-ounce copper by Max Jennings, a sheet metal man.

Flat seams were used. Since erection no repair work has been necessary on the tower, painting or otherwise, with the single exception that the cross at the very tip has been regilded once.

There is a record of 24 years of service with the original cost the only cost. What wood or composition roofing can offer a similar record of service? And that's not all. The roof on this tower dome is exactly as good today as it was when erected. Should the building be torn down, the copper covering the dome could be used elsewhere for another quarter century or more. Has anyone ever seen a wood shingle or composition roof that could be taken off after a quarter century service and made to do further service?

Tom Reynolds Thinks Liverpool Stack Bottom Should Be Open

This Prevents Collection of Soot, Salt Water and Other Foreign Matter

TOM S. REYNOLDS of the Tom S. Reynolds Sheet Metal Works, Portland, Oregon, has

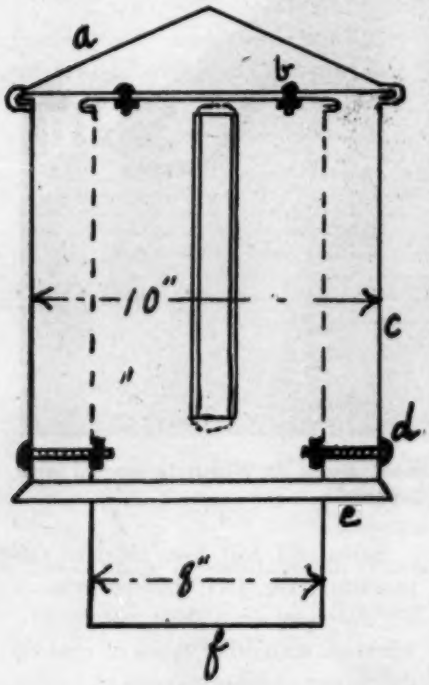


Figure 1.

something of interest to offer on the Liverpool Stack problem. He writes as follows:

To AMERICAN ARTISAN:

I am greatly interested in the several articles that have appeared in recent issues of AMERICAN ARTISAN on Liverpool stack heads. I have had quite a little experience with them for galley stacks, down draft chimneys and ventilating and wish to offer a suggestion that is of vital importance in the manufacture of these heads. An old sea cook who had sailed the seven seas for forty years whispered it into my ear and I am passing it along for what it is worth.

The point the old sea cook made was that a water pocket should be avoided at the bottom of the stack. If an opening is not made in the bottom of the stack, rain and salt water gets into it and soon rusts it out. If the stack is on the galley of a ship, the ship will often roll, permitting the water to go down inside. In addition to this the head is easier assembled if tubes and bolts are used, leaving the bottom open for the water or smoke to escape, while leaving no place for soot to accumulate.

I also find it easier to assemble by seaming a leach on the stack proper and bolting the head on the bell to it. If a neat looking job is wanted, then single seam a cap on the top of the bell after bolting the two heads together.

Also turn outwards, both on stack and bell, a 5/16 inch edge at an angle of 45 degrees on each side of the openings, and a 5/16 edge turned inward and hammered flat at the top and bottom of the openings to act as stiffeners. Also turn out the same at the bottom of the

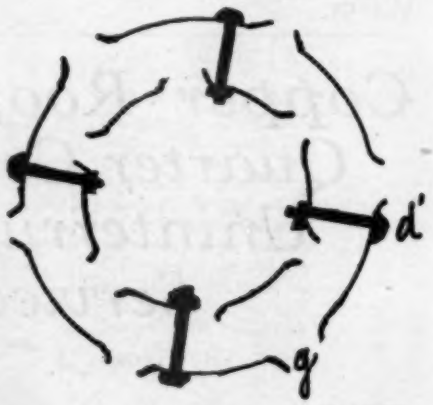
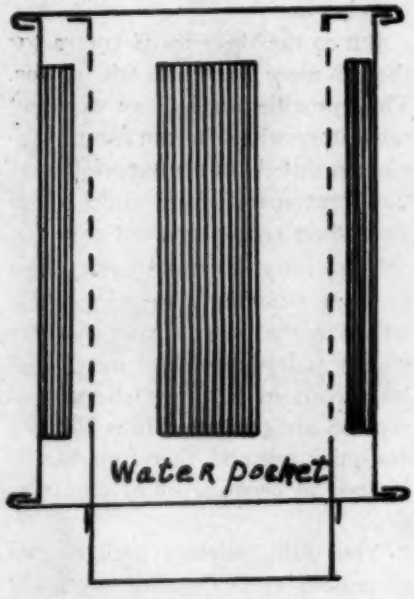


Figure 2.

bell to a 5-degree angle for the same purpose.

The area of the openings in the stack must not be less than the area of the stack, but need not be any greater. The openings in the bell must be staggered to openings in the stack. I submit this with all respect to Mr. Kothe and Mr. Cotton.

The following is the key to the diagrams shown with this article. In the diagram, figure 1, "a" is the



Showing Water Pocket.

cone tip seamed on for purposes of shedding water and also for the appearance of the stack; the ½ by 4 3/16-inch round headed stove bolts used are shown at "b"; "c" is

the bell; "d" shows the stove bolts used inside of the tube spacers; "e" shows the opening at the bottom to let out water and smoke as described in the article; "f" is the stack. In figure 2, "d'" again shows the stove bolts used; at "g" the edges of the openings, which are staggered, turned out at an angle of 45 degrees.

Nu Dura Dinner at "Philly," April 26, Big Success

Speakers Divide Time Between Wit and Seriousness

By William C. White

THE Roofing, Metal and Heating Engineers and the Metal Club held their annual "Nu Dura" banquet in Philadelphia, on Monday, April 26th, at the City Club in Broad Street. A very large gathering participated in the evening's round of business pleasure. The advance propaganda and song sheet put into shape by Secretary Ritter was commented upon for its merit. The slogan used on the song sheet was, "The Tin You Love to Touch," scrolled around a roll of Nu Dura.

The toastmaster of the evening was no other than William E. Hopkin, who has been associated with the industry for a good many years. After an excellent meal was served, during which music was rendered by the Nu Dura orchestra, and solos by "Dick" Hanlon, the toastmaster called on Warren J. Carter. Mr. Carter discoursed on the subject of "Distribution." He told of his 40 years of experience in the industry, during which time he has made a careful study of it, he was in a position to know what the industry needed, especially the sheet metal contractor.

"The Buyer and Seller of sheet metal products must be more closely brought together in their relationship and in this way create a more coöperative feeling." What he had in mind for the future betterment of the contractor was to increase business; protect the sheet metal contractor from outside detriments; elevate the industry to its proper plane and assist in every possible way to have sheet metal products displace the many substitutes that have taken the place of sheet metal. He spoke of Philadelphia as the Wonder City in which the first iron mill was operated; the first organization of the sheet metal contractors was formed 21 years ago and of the harmonious way in which all distributors and contractors work. He brought out many convincing facts that have proved beneficial to the sheet metal contractor. A picture was displayed showing where a fire had gutted a school house, but the roof made of sheet metal not only confined the fire to the building, but kept it from spreading to adjoining property. "Hints like this would convince the home owner of the value of a sheet metal roof." In concluding, he advocated the use of Nu Dura by talking it, showing and selling it.

The next speaker called on was M. J. Lenihan, who talked on "Trade Efficiency." On June 11, 1926, he will have been in the industry 37 years. He digressed long enough to tell of his entrance into the "tinkers" business which was not a matter of choice but of compulsion, as he was "out of a job," but has long since that time appreciated its position among the leading industries. His brief talk was full of "straight - from - the - shoulder" business facts. He advised all to set a standard for each year, and to exceed this shows progress." Study your prospective customer, his character and his ability to pay. Respect the right of others. Pay all obligations before you yourself take any profits. Do your work on a profitable basis. Don't complain if all your bids are not accepted. Don't force a product on a customer unless you know it is to his advantage. Give the customer what he or she wants.

Toastmaster Hopkin then called on Howard J. McGinley, president of the Metal and Heating Engineers, who discoursed on the subject of "The Selling of a Nu Dura Roof." He brought out the many advantages of Nu Dura for roofs over other metals, one outstanding feature in particular being its lightness, and urged all to get in line and push this remarkable product, Nu Dura. He also spoke of the scarcity of all round sheet metal workers. "Until the apprentice is made an attractive proposition, both as to conditions and wages, he will not stick. Although the vocational schools are turning out graduates, most of their experience is theoretical. What the industry needs is graduates from the helpers' bench." He urged more coöperation between Mill and Sheet Metal Contractors.

Mr. McGinley is a "hundred per cent" for Nu Dura, which so far has gone way over the top, and asked the coöperation of all to make Philadelphia a City of Nu Dura.

Albert L. Moise, a lawyer by profession but a good story teller by choice, was then asked to say something. Intermingled with his many side-cracking stories were some real business principles. "Build your business on a bed-rock of Character. Don't wait until you have a law suit before hiring a lawyer; pay him to keep you out of court," were some of his suggestions. He said the reason why the big corporations usually win their cases is due to the fact that they hire lawyers at all times and not only when they are involved in legal proceedings.

The next speaker was Dr. Thomas W. Davies, known in "Philly" as the "Baseball Parson." He told of the present and future plans of the administration in making Philadelphia a better city.

Edwin A. Scott was called on to give a talk on "Trade Conditions." His discourse, although brief, brought out the many factors that

are making it easier for those engaged in the industry to greatly increase the volume of their business. Some of the associations that are spreading propaganda in many forms to assist the sheet metal contractor are: The National Warm Air Heating and Ventilating Association; American Zinc Institute; Sheet Steel Trade Extension Committee; Copper & Brass Research Association. The National Association of Sheet Metal Contractors have compiled a "Text" book which will be distributed in the near future to those instrumental in buying and planning for the use of sheet metal products. These essential elements are greatly assisting in the rapid growth of the sheet metal industry.

The treat of the evening, although it was almost midnight, was the appearance, at the speakers table, of "Artie" Bittong, who burlesqued the speakers of the evening. His humor was excellent and kept the remaining diners in a continuous uproar. It was an evening enjoyed by everyone, not only for the pleasure derived, but for the many constructive business criticisms and trade hints expounded by the speakers.

Fadner Comments on Schmidt's Method of Computing Overhead

Schmidt Refutes Fadner's Objections and Throws New Light on Problem

MR. G. B. FADNER of Cedar Rapids, Iowa, has a contribution which he wishes to offer on the method of computing overhead charges. He refers to the method outlined by W. V. Schmidt in our April 17th issue.

To AMERICAN ARTISAN:

I have read with a great deal of interest the article on overhead by W. V. Schmidt in your issue of April 17, 1926. I agree with Mr. Schmidt on everything he says, except the manner in which he distributes his overhead. It is all well and good to divide the overhead among each of the men employed equally if you pay them all at the same rate per hour, but if you pay one man $1 per hour, another 75 cents per hour, another 65 cents per hour, another 50 cents per hour, you have four different rates of pay. This being true, I do not believe it is fair to charge your customer the same rate for overhead on the 50-cent man that you do for the man to whom you pay the $1 rate, because your $1 rate man is a skilled mechanic, capable of producing five times the amount produced by the 50-cent man. You do need some lower rate men to do the work which does not require a high degree of skill.

The system of overhead distribution outlined hereinafter is the one I use. I find that it works better than any other I have seen; it gives the proprietor of the large shop a wide field; it gives him a chance to meet all competition, as, of course, there are some classes of work upon which the contractor cannot charge for highly skilled mechanics.

For purposes of illustration of this system take class A rate as $1; class B rate, 75 cents; class C rate, 65 cents; class D rate, 50 cents. These four rates totaled equal $2.90, which is your total hourly pay roll charge. Your overhead is $3 per hour, or 75 cents per hour per man, but I do not distribute it that way. In my method you add the overhead of $3 to the pay roll of $2.90, which equals $5.90. I then proceed thus:

			Per hour
100/2.90	×	$5.90 equals	$2.00
75/2.90	×	5.90 equals	1.55
65/2.90	×	5.90 equals	1.35
50/2.90	×	5.90 equals	1.00
			$5.90

The profit is added to this figure.

Mr. Schmidt replies to Mr. Fadner as follows:

"Thanks for yours of the 26th, enclosing a copy of a letter from one of your subscribers with his comment on the article 'Turning Overhead Into Profits' published in the AMERICAN ARTISAN, April 17th.

"Your subscriber agrees with everything in the article except the manner of distributing the overhead. He states that the flat rate of overhead per man per hour would be all right if all men received the same rate of pay, and he explains his method and gives an example showing the overhead rate per man per hour varying according to the rate of pay the mechanic receives.

"In doing this he is distributing his overhead upon a basis of direct labor cost which we maintain is practical only when every man receives the same rate of pay.

"Thus while he appears to agree with the method to a certain extent, our views on distributing are directly opposite. He believes that our method will not be right when varying rates are paid for labor and we maintain that ours is proper because of this condition.

"He states that a $1.00 per hour man is a skilled mechanic capable of producing five times as much as a $0.50 per hour man. This is no doubt true if both were doing work requiring a skilled mechanic. But the unskilled or 50 cents per hour man ought to load or unload as much material or push a truck just as fast as a highly skilled mechanic and should devote his time to work of that nature so far as possible.

"You will usually find that the lower paid mechanic requires the same amount of space in which to work; his tools cost just as much and he is responsible for as much overhead expense as the highest paid mechanic.

"Consider the value and depreciation of the tools used and the space required by a layout man. Then consider the space required and the value of the machinery used by the operator of a cornice brake, shears, roller, punch or the driver of a truck. For this reason we maintain that it is not proper to charge a job requiring a certain number of hours of highly skilled labor with

only hand tools twice the amount of overhead you would charge to a job using unskilled labor, simply because the wages paid on one job was twice as much as on the other.

"We believe this will explain to some contractors why their competitors can underbid them on a job requiring a great deal of high priced labor and still make a profit. They charge the job with overhead based on time instead of labor cost. This also accounts for actual profits being smaller than expected on jobs requiring inexpensive labor and the use of much equipment."

This should be studied carefully by the contractor.

Showing Construction of a Hopper Used for Handling Grain in Mills

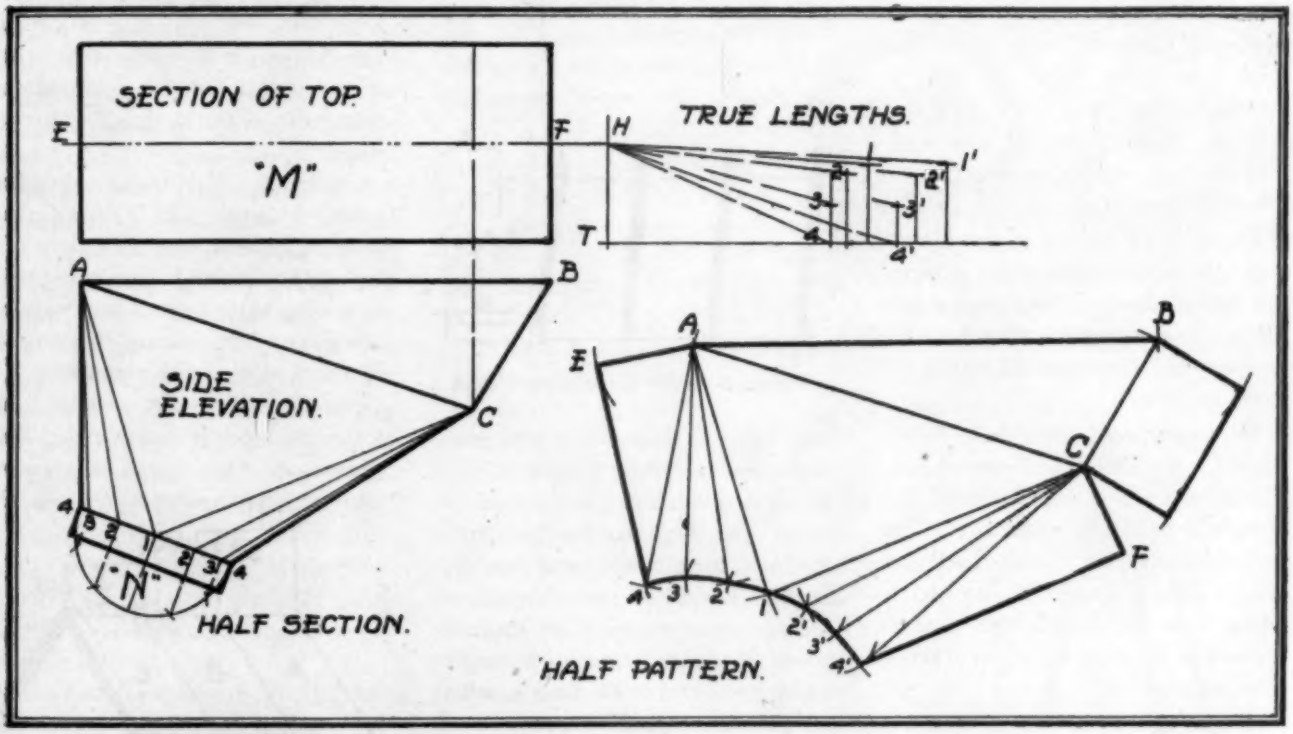
Sketch Shows How to Simplify Pattern Construction of One Type of Hopper

By O. W. Kothe, Principal, St. Louis Technical Institute

OFTEN in mills, grain elevators and factories where chutes and hoppers must be made for conveying the grain into other parts of the building, varied designs of hoppers are used.

Here A-B is the length of the hopper, while the width is shown by section "M." On the heel, or back side, a slope is produced as B-C as conditions may allow, and to this a square to round is added from the line A-C. From here on the pattern is easily developed by first treating the lower portion as a square to round and then adding the upper part to the base. When these outlines are drawn, we describe the half section "N" and divide into any number of equal parts. Square lines into the base line 4-4 and draw lines to the corners A and C as shown.

In a problem of this kind it is often better to use the elevation method for determining the true lengths rather than developing the plan. This is especially so in larger work, where the projection of lines is more difficult and where slight inaccuracies may produce wider measures in the pattern. So we pick elevation lines, as A-1-2-3-4, and set them, as T-1-2-3-4, on the base line of the diagram. We then erect lines equal to those in the half section "N." Join these points with H and we have the true lengths. In the same measure pick the lines C-1-2-3-4 and set them as T-1′-2′-3′-4′.



Patterns for Hopper

The pattern for the transition is developed the same as we have discussed numerous others in past issues, by first drawing the line A-C to correspond with our elevation. Then we pick the line C-D and set it as C-B in pattern. After this we pick the line A-B from elevation and set it as A-B pattern. This completes the necessary work.

Provision Must Be Made for Expansion and Contraction

Shows How Damage from Expansion and Contraction Can Be Avoided

By L. S. Bonbrake

DURING the past score or more years there has been a decided swing back to sheet metals for roofing purposes. Hence it behooves the sheet metal contractor of today to become thoroughly familiar with

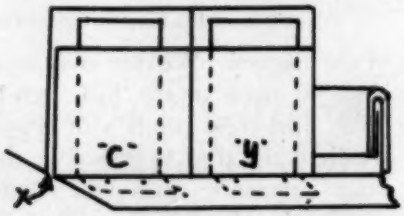


Figure 1—Double Seamed Standing Seam

the new methods, trade tricks and kinks, in order that he will be enabled to talk and work with conviction. Usually the old time roofers are not very enthusiastic about disseminating trade knacks, such as I expect to pass along in this article.

In the smaller cities there is as yet no definite line of demarcation limiting the sheet metal contractor. He is supposed to execute all manner of roofing.

A copper roof must have provision for expansion and contraction; hence my object in writing this article is to clearly point out all the provisions needed to make such provision on a copper roof, in order to show how the trouble and damage caused by expansion and contraction can be avoided.

There can be no cause for worry in laying a double seamed standing seam copper roof, with the seams one inch high, if due diligence and care is exercised to nail the cleat close to a square corner, where it will have a straight pull on the seam during a high wind. With the cleat located in the exact center of the seam and nailed close, the roof strips will have an equal chance to give to the right or to the left when climatic conditions cause them to expand or to contract.

The compensation of expansion and contraction is counterbalance and it must be observed with the sheet metal. However, research and observation has clearly shown that vibration and suction have caused more harm to standing seam roofing than a lack of expansion and contraction provisions. Nail your anchors close up to the square corner of the cleat and suction with vibration will have no chance to get a start on the standing seam. See Figure 1.

I have also discovered when forming flanges for copper seams, that

Figure 2—Eave Expanding Finish

care must be exercised not to grasp the copper with the tong at the end of or beyond the last turn of the tongs; let the tongs lap back upon the last turn made and avoid a buckle, which is sometimes complained of as creeping out upon the sheet in a short time to a narrow point at the end of the buckle, where a small hole is liable to appear. It is suggested that all kinks be smoothed out at the bottom turn of the flanges, before double seaming and avoid this buckle. An eave finish, including a projection for rain drip, is indicated by Figure 2, which is simple in construction, practical and easy to make, giving a certain expanding joint as an eave finish. A strip three inches wide of No. 24 metal X is nailed flat along the full length of the eave, projecting over the eave line one inch, more or less, as may be needed or desired. An angle strip of lighter material is used as an apron, covering the eave sheeting boards edge, with its angle extension portion C laying under and against the heavier eave projection. As the roof strips are laid one by one, a hem is formed on the eave end of each one to embrace the metal projections underneath, which forms a slip or expansion joint. The comb, Figure 3, may be completed with a single fold standing seam, with much less labor and less material than with a double fold seam. A full description for forming this seam was given in the March 13th issue.

Figure No. 4 shows an expanding gable end finish, with a water guard produced in the operation, which is especially adaptable for the gables of a neat veranda roof, and will do away with the tedious covering of 2x4-inch studs quite frequently laid along the edge. An unsightly and awkward piece is thus avoided. As shown in the figure, a strip of seamed and soldered roofing the

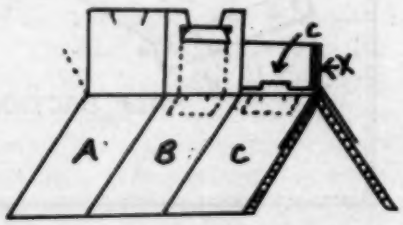


Figure 3—Single Fold Comb Formation

length of the gable and two folds will do the work and allow stock for the nailing of the gable below the water guard.

Split cleats were used in laying standing seam roofing over half a century ago; however, the prongs of the split were not intended to be

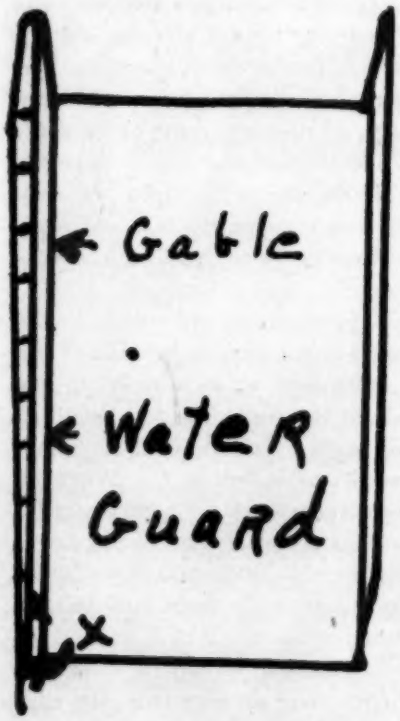


Figure 4—Illustrating End Nailing

turned down over the higher and lower flanges of the seam for the purpose of laying several roof strips ahead of seaming in case of storms, as was advised by an expert several months ago. That advice if carried out would work havoc on the roof and to the anchorage. Every seam should be double seamed before the following one is cleated. The only purpose of a split cleat is to hold the two flanges down tight upon the sheeting. After a heavy pair of tongs have been used to clasp them in unison and with a slight lift, stamp them down upon the sheeting, squaring the flanges to fit together, when they are held there by folds of the split cleat and are ready for double seaming.

Excessive expense is the first and only cry when talking copper roofing to a builder. Apropos of this we will mention a column news item appearing in AMERICAN ARTISAN about three years ago. John Decker and Son, Philadelphia roofers, were lifting some parts of the old copper roof on the Christ Church which had been giving service 175 years. Directly the story went about that this old copper roof had at last struck its colors. But investigation proved that it was not a repair job to the copper roof at all. The copper roof was only lifted in parts to get at a rotted timber upon which the roof rested. When the timbers were removed, the same copper was relaid, perhaps to give service for another century or two. Think of it, 175 years of service as a roof and not one cent of outlay for painting or other upkeep.

Copper O. G. Base and Tower, Octagonal

First, find the length of the bottom and top lines of each base section and the width as formed to go over the O. G. base, allowing a half inch to envelope an angle strip X that has already been nailed on to the bottom edge of the bottom sheeting board, around the base. This angle strip should have a ¼ inch projection, to engage the quarter inch hem on the bottom edge of the

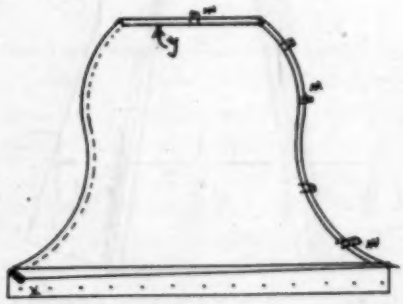


Figure 5—Copper O. G. Base Octagonal

first course of base sheets, which will provide the base eave finish.

Add ¼ inch at the top of the O. G. base for forming a hem Y onto which to hook the bottom of the tower sections. After the O. G. sections have been cleated (see M Figure 5) in the center with copper cleats 1 inch wide, or an abundance of anchorage, which size of the base will determine, and the cleats M are nailed close up to the fold edge, a snug and safe seam will exist, when malleted down smooth. The hip connection of the base sections can be neatly made by finding (at the structure), the exact curve of the octagon. To the length of each base section add ½-inch for a ¼-inch seam at their ends, or enough material to give a seam the desired width. Then the copper can be prepared at the shop to cover all the base sections.

To execute this formation readily, it would be convenient to have at hand the exact profile of the O. G. line sawed in wood. Trace the hip line of the end of each flat section, being sure to add an extension of at least ½ inch or ¾ inch, for the hip seam, giving stock for a one-quarter or 2⅜ inch wide hip seam which has the preference in some sections. Cut two pieces of any metal about 50 per cent thicker than the copper used, to the curved shape of the hip line, on one end of the thick metal. It may be 3 or 4 inches wide and of any shape at the back edge. Hammer the copper back to the width of the fold of the seam desired, making it tight over the thicker pieces. It is sometimes necessary to snip into the folding edge slightly, especially at the center of the concave. Working right handed, the right hand fold should appear on top side of the copper (see base Figure 5). The other end will be folded on the under side, on all but two of the sections for each course. Set the rolls to form the sections to the degree of curve required. If the concave is formed from the bottom of section, roll back and out to get the convex from the top side width. If, on passing through the rolls for the first time, the copper should show a dis-

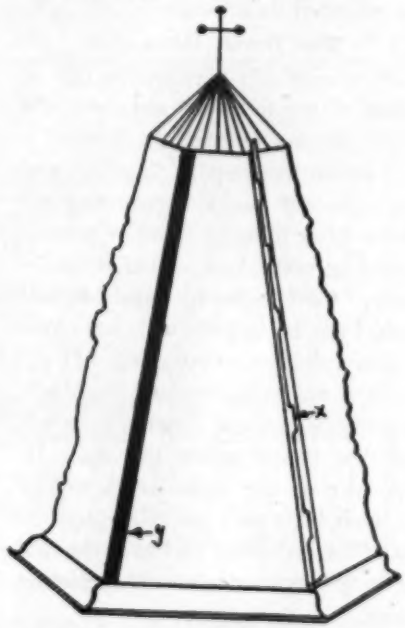


Figure 6—O. G. Base and Tower or Steeple

position to kink or buckle, back out, and lay it on a mandrel, with the thick metal still in its groove, and mallet the buckle out, after which it will be found that the copper will pass through the roll smoothly to where wanted. This seam groove formation is taken from the slip joint in eave ttrough.

To remove the thick metal from its groove, open out the curve slightly and the metal can be pulled out with ease.

Start laying with a section back of the tower, the least prominent location. To commence with, use the only section having the seam groove at both sides. On top cleat wherever necessary, with narrow anchors or copper strips, over the edge of the groove. Hook the under flange of each section into the groove on top, of the section laid, and continue in this manner around the base. The last section will be made at the shop, with both flanges or ends formed under, and to finish the connections on the roof, the left hand flange may be placed in the groove of the last one laid; however, to finish the seam at the right and complete the base encirclement, the right hand flange may have to be sprung open and adjusted to meet any irregularity in the base sheeting, then peened back to place or into the groove, when all the hip seams may be malleted down smooth and tight.

The Tower, Octagonal

A presentable appearance can be made of the tower or steeple at the eight corners by straight work. It is too inconvenient in location, and an awkward position, requiring too much labor to make a double seamed standing seam, and withal unnecessary. Corner seams finished one-half inch in height will not look clumsy, dumpy or bungling. If the corners are to be one-half inch high, one flange, the left, from bottom will be that height when put up. Its opposite on the same panel will be ¼-inch high and ⅜-inch extension to be formed down and over the half inch, giving a single fold, standing seam.

As an anchorage, use cleats one inch wide, lay them flat against the high flange, extending to within ⅛ inch of the top. Nail them close to the flange. Snip in from the top of the high flange, to the side top of the cleat. The snipped portion is formed to embrace tightly over the end of the cleat. When the seam is completed, the cleats will be folded over the low flange, engaging the higher, and covered, see X Figure 6 Cleats.

Contraction and expansion is provided for in this method for the base, in the "slip" hip seams, and their anchorage and with the angle strip eave finish. For the tower, it is in the hip seam fold. No nails go through the body of the covering, and soldering is unnecessary when

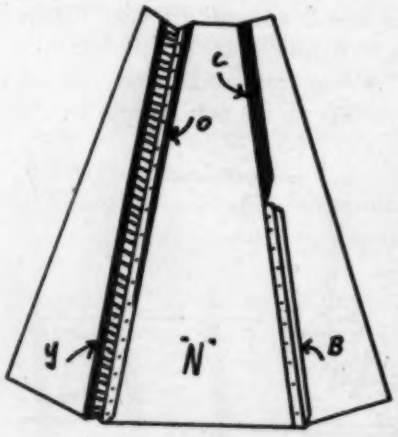


Figure 7—Utility Hip Corner Covering

good seams are made. Narrow hems will make a seam lay closer, smoother and tighter, then wide ones. If preferred, the standing seams may be malleted down flat, as indicated at "Y" Figure 6; with "X" under and the top side smooth. The natural position of the hip seams, especially of the base, prevent rain water entering readily. From the fact of their angling, almost perpendicular position, water is directed from them instead of entering. However, we usually used a bronze (copper and tin) adhesive preparation to coat the edge of the base hip seams, for keeping out dampness. For a tin base and tower covering we used an adhesive mixture of druggist's oxide of iron dampened with linseed oil and thinned somewhat with coal tar, which was traced along the edge of the seams, before the covering was painted.

Figure 7 illustrates two methods of covering towers, steeples and hip roofed ventilators, usually found on barns, home built and generally very large, set upon the comb of the roof. While efficient and look well, especially the one to the right "y," they are simple in construction and readily handled in an inconvenient location.

Tapered strips are cut to fit the panels of the sections between O and C, with half an inch added to one side of the panel, the full length of the panel. This ½-inch is "blind-nailed," as shown at C. When all the corners have been thus nailed a small ridge roll is fitted to place over the corners and smoothly "blind-nailed" through their aprons to a finish.

The nailing should be close and slightly over an inch from the edge of the apron, so that a quarter inch fold from the aprons edge (which has already been started with a crimp) will cover the nail heads; Y indicates one side of the roll completed. "O" shows the edge nailed, and ready for the "Blind" fold. "X" on opposite ridge indicates the ½-inch edge of panel "N" overlapping "B" with the bottom portion nailed and ready for the finish by malleting. "C" shows the completed seam except the finish given the "blind nailed" edge, with the mixture previously mentioned. When any of the materials are used that require painting, to acquire longevity, we have always preferred the ridge roll method, as the ridge can be painted a color, as the trimmings of the building, and the panels the same color as the body.

The dome of the unfinished covering of the tower shown by Figure is usually made circular, in which event the dome starting sectional will be octagonal for an octagonal tower, each section will have a straight line as a base upon which a hem is formed to engage a quarter inch angle to be formed on the top end of the tower metal. A six section formation of this sort of a dome was shown in March 20 issue of AMERICAN ARTISAN. Illustrated and fully described by O. W. Kothe.

Livezey Sheet Metal Works Cashes in on Advertising Tieup

Elmer Livezey Deserves Much Credit for His Initiative in This Blotter Tieup

BUSINESS men catering to the public on a retail basis have long known and appreciated the advertising value of tying up their store, window displays and stock with local current events that have aroused public interest. Until quite recently, however, these retail men have had the field almost entirely to themselves, because sheet metal contractors and warm air furnace installers had not fully appreciated the value of such advertising. However this apathy has been overcome, to some extent at least.

The Livezey Sheet Metal Works, New Castle, Indiana, has recently produced an interesting bit of blotter advertising. What gave them the opportunity was this: The city of New Castle recently installed a number of stop and go traffic signals. The necessity for stop and go signals in a town is the sign of progress—it indicates that the city is growing, real estate values are increasing, business advantages here are more promising, and what not. Whatever the cause, here is an occurrence of sufficient public interest to have the local newspapers play it up. These local mediums of news got everybody to talking about the new traffic signals. Here's an opportunity for some wide awake sheet metal contractor to tie up to an item of public interest and cash in on the advertising. And that is exactly what the Livezey Sheet Metal Works has done in this case.

The illustration herewith shows a blotter which the Livezey Sheet Metal Works has used to particularly good advantage. It is about as neat a tieup to an item of public interest as has appeared for a long time, and Mr. Elmer Livezey deserves a great deal of credit for his initiative in getting out this blotter at a time when he did.

It is needless to say that good results are obtained from advertising of this character. It is almost criminal not to utilize such advertising opportunities to the fullest extent.

Of course, it has been impossible to reproduce the colors of the blotter as they appear in the original. The border of the blotter is red. The Stop, Caution and Go words are an exact reproduction in color of the signals lights; namely, the Stop is red, the Caution is orange and the Go is green. The remainder of the wording is black, forming a good contrast. The original was 3¾ by 9 inches.

What Will Remove Lime From Brass Kettle?

To AMERICAN ARTISAN:

We have a customer who has an antique brass kettle. She keeps water in this on a register, and when it boils dry, the lime in the water sticks to it.

What will take this lime out?

YOUNG HARDWARE COMPANY.

Merdo K. Williams, Chicago Manager, Rome Brass and Copper, Dies

Merdo K. Williams is dead. Mr. Williams had been manager of the Chicago branch of the Rome Brass & Copper Company, of Rome, New York.

During his life Mr. Williams made many friends both in and out of the industry of which he was so intimately a part.

Heating Systems & Supply Company Moves to 107 West Van Buren, Chicago

Heating Systems and Supply Company, 169 North May Street, Chicago, are moving their offices to 107 West Van Buren Street, Chicago, where they will have a very attractive display room. This new location will make it very convenient for the trade.

Showing How the Livezey Sheet Metal Works, New Castle, Indiana, Ties Up Its Advertising with Current Local Events That Have Gripped Public Interest

Tregoe Says Selling Goods on Installment Plan Dangerous Unless Modified by Reason

Stimulation of Business by Unwise Use of Credit Brings Reaction

ALMOST equally divided opinion about the principle of merchandising on the installing plan exists among credit managers according to the results of a survey conducted by the Public Relations Department of the National Association of Credit Men that was announced today by J. H. Tregoe, the executive manager of the association.

"Making it easy for people to buy beyond their needs or to buy before they have saved enough to gratify their wishes tends to encourage a condition that hurts the human morale and supports a form of transaction for which credit is not primarily intended," Mr. Tregoe said.

"Many business executives in their zeal for distribution have failed to understand the explosiveness of credit when it is improperly used. The events of recent years clearly show that the stimulation of business by the unwise use of credits is merely a temporary measure and has a reaction in the serious disturbance of business and prices.

"Selling goods at the expense of safe credit tends to cheapen it, to make serious losses and to disturb business morale. Selling goods on the instalment plan for individual consumption or for indulgence in luxuries is highly dangerous, unless the distribution is reasonable and the credit used in such transactions causes no disturbance of the credit supply.

"The annual convention of the association that will be held in New York May 24 to 28 will give further consideration to the instalment problem with which business is confronted. We shall try to determine at that time to what extent merchants and manufacturers are forced through competition to merchandise their goods on an instalment basis."

"The instalment plan survey also shows that an overwhelming majority of the association's members agree that instalment selling has been carried too far.

The report of the research conducted by Marshall D. Beuick of the Public Relations Department reads as follows:

"Approximately 57 per cent of the credit managers whose opinion was sought disapproved of the plan of instalment selling while the remainder entertained no hostility to it.

"The survey covered every state in the union and a great variety of businesses. About 140 large commercial centers were sounded through credit managers in the wholesale, manufacturing and banking fields. Many of the persons who gave their reactions to instalment merchandising are owners, presidents, vice presidents and treasurers of their particular concerns.

"About 90 per cent of the credit managers who furnished the information for the research stated that they were convinced that installment selling had been carried too far for continued safety in business. The remaining 10 per cent expressed no fear of the installment plan as now conducted.

"In making this study the premise was accepted that credit managers would be the best judges of the condition of instalment merchandising on account of the close observation they must make of the conduct of retail businesses before passing upon the granting of credit. At the same time it was realized that it would be almost impossible to obtain any accurate figures about the extent of the installment business on account of the secretiveness that surrounds such business operations in many regions."

Mr. Tregoe said that the results of the survey should convince bankers, finance and acceptance companies that a revaluation of the installment business should be made to insure the healthy business conditions that we now enjoy.

"When you have a reflection of the opinion on instalment selling of nearly 30,000 credit executives who represent our membership, you have something that is worthy of studious consideration. What this survey indicates should be heeded. Although many merchants may disregard it, the bankers cannot. It remains with financial men whether or not the dangerous condition in instalment merchandising is to continue."

"Sixty" Years Experience and Not "Six" in Pecora Paint Ad, April 17 Issue

We regret to state that an error inadvertently occurred in the advertising section of AMERICAN ARTISAN for April 17. In that issue, page 14, in the left hand page of double page spread of the Pecora Paint Company the word "six" in the first line of small type should have been "sixty." The sentence should read: "Sixty years' manufacturing experience has enabled us to develop Pecora Asbestos Furnace Cement to the highest degree of cement efficiency." We are very sorry this error occurred and wish to call the attention of AMERICAN ARTISAN readers to the correction.

The Peoria Paint Company was established in 1862 by Smith Bowen. Since its establishment the company has gone steadily forward with research and expansion, letting the former precede the latter.

Minneapolis Office of Western Products Under Direction of Fred Rogers

The Minneapolis office of the Western Steel Products Company, Duluth, Minnesota, manufacturer of Western steel furnaces, will hereafter be in charge of Fred Rodgers, whose office is located at 1645 Hennepin Avenue, Minneapolis.

New Jersey Zinc Maintains Permanent Exhibit at Homebuilders', New York

Illustration Shows Standing Seam Roof, Leaders, Gutters, Hangers and Paint

A UNIQUE feature in selling the general public and familiarizing it with the many uses of sheet metal and paint, is that of the New Jersey Zinc Company that maintains a permanent exhibit at the Homebuilders' Exhibits, Inc., located at 441 Lexington avenue, corner of 44th street, centrally situated in the great business section of New York, and but a stone's throw from the Grand Central station.

The accompanied photograph shows the wing of a cottage equipped with Horsehead Zinc, leaders, gutters and hangers, the roof being laid with standing seam roofing. The wood portion of the exhibit is coated with the well known 40-40-20 paint, distributed by the New Jersey Zinc Sales Company.

Not only is this exhibit attractive to the many home builders that visit it, but is valuable to the sheet metal contractor, builder and architect in putting across the use of "sheet metal."

The slogan of the Homebuilders' Exhibits, Inc., is "A Permanent Presentation of Your Product," "A Sales Stimulation Service." George C. Carothers, formerly associated with the Copper and Brass Research Association is sales manager.

Permanent Exhibit of New Jersey Zinc Company at Home Builders' Exhibits,

C. C. Blodgett, New York City, Dies at Age of Sixty-six

C. C. Blodgett, Secretary of the Laundry Age Publishing Company, New York, for the last five years, died at New York on April 24 at the age of sixty-six.

Mr. Blodgett formerly represented AMERICAN ARTISAN in the east. He was a bachelor and was very well liked throughout the industry. W. C. White succeeded him as AMERICAN ARTISAN representative in the east.

Production Record of N. & G. Taylor Company Made for Third Time This Year

For the third time since the beginning of the present year the highest previous production record in the Hot Mills at N. & G. Taylor Company's plant at Cumberland, Maryland, has been surpassed, production of blackplate for the week ending April 10th reaching a rate of approximately 528,000 boxes annually.

Can Screws.

From Stanley King, Huntingdon, Tennessee.

Can you tell me who makes can screws?

Ans.—Merchant and Evans Company, Philadelphia, Pennsylvania; Consolidated Fruit Jar Company, New Brunswick, New Jersey, and William Vogel and Brothers, 27 South 9th Street, Brooklyn, New York.

Electric Refrigerators.

From Harry Lyman, Clarinda, Iowa.

Please inform me who makes electric refrigerators.

Ans.—Isko Company, 111 West Washington Street; Blazek and Company, 2249 W. Lake Street; Frigidaire Corporation, 317 North Michigan Avenue; all of Chicago, and Iceless Machine Company, 12014 Iowa Avenue, Cleveland, Ohio.

Metal Signs.

From Herz Furnace Company, Sycamore, Illinois.

Kindly inform us who makes metal road signs and metal agency signs for store fronts.

Ans.—Fred J. Meyers Manufacturing Company, Hamilton, Ohio; Metal Sign Board Company, Kalamazoo, Michigan; E. A. Shank Sign Company, 243 West 55th Street, New York City; Ingram-Richardson Manufacturing Company, Beaver Falls, Pennsylvania, and American Art Works, 309 South La Salle Street, Chicago, Illinois.

Random Notes and Sketches
By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

On Wednesday of this week I had the extreme pleasure of spending the day in company with my friend Jack Stowell, at Aurora, Illinois. Jack is one of the most likable and enjoyable young feilows I have ever met. Aurora has a population of about 41 thousand and I must say that most of those 41 thousand are well enough acquainted with Jack to call him by his first name when he meets them on the streets. Jack, you know, is a regular whirl wind in the business world. He is certainly on the way up and is dragging the sheet metal industry up with him. But he doesn't spend all of his time working. He has held the world's speed record for skating and has numerous cups and trophies in his office attesting his superiority in this sport. In golf and wrestling he also excells and has captured several trophies in these sports as well. He is so enthusiastic for golfing that he thinks the golfers in the sheet metal industry should hold a tournament. The Editor is going to have a great deal to say about the progressive business methods of Jack in next week's issue, so I can't steal too much of his stuff. But I wanted to show Jack just how much I enjoyed my visit with him.

* * *

With the coming of spring the great exodus or treck back to the golf links has begun. Of course the sheet metal and warm air heating industries are not without their ardent enthusiasts for the game. But with the opening of the golf season there are also always recorded many instances of harmless humor with which to lighten the day's work. Here's one that is good for a laugh. C. C. Campbell, Jackson, Michigan, who represents J. T. Ryerson & Sons, and Arthur E. Clark, Lansing, Michigan, of the Michigan Employers Casualty Company, Lansing, Michigan, were enjoying a foursome with two other gentlemen when they sliced their drives into the rough and went in search of the balls. They searched for a long time without success, a dear old lady watching them with kindly and sympathetic eyes.

At last, after the search had proceeded for half an hour, she spoke to them: "I hope I'm not interrupting, gentlemen," said she sweetly, "but would it be cheating if I told you where they are?"

* * *

W. H. Young, of the United States Register Company, Battle Creek, Michigan, and R. S. (Tommy) Thompson, Indianapolis, of the Mr. Vernon Furnace & Manufacturing Company, were giving their orders to the waiter in a certain restaurant. This certain restaurant had made its reputation upon one waiter who has never yet been found wanting in translating an order into a language of his own, and he and the cook understand each other perfectly.

"I want some rump steak rare," said Tommy.

"Slab of moo—let him chew it!" called the waiter without hesitation.

"I want a bowl of tomato soup," ordered W. H. Young, "a plate of beans, bread and butter, a piece of apple pie and a glass of water." Anxious to see what the waiter would do with that order, both Tommy and W. H. waited expectantly. The waiter seemed puzzled for an instant and W. H. thought he had him stumped. Suddenly the waiter shouted: "One splash of red noise, platter of Saturday nights, dough well done with cow to cover, Eve with the lid on and a chaser of Adam's ale!"

* * *

The solemn-looking man, dressed severely in black and smoking a black pipe, had been silent for many miles of the journey.

From the moment they had pulled out from the city terminus until they were some eighty miles on the way he had been contemplating the luggage pack opposite, which by the way belonged to my friend Paul Fischedick, Milwaukee, Wisconsin, who represents Follansbee Brothers Company, Pittsburgh, and never a sound passed his lips.

Suddenly, however, he stirred, and turning to Paul, remarked:

"There is much unrest in the world just now, my friend, much unrest."

"You're right," said Paul: "I trust you're not unmindful of the fact that we each have a duty. We must combat this unrest, my friend."

"I am doing my best," returned the other man.

"How?"

"Well, it's like this," came the reply. "I manufacture mattresses."

In Memoriam

Daniel Stern

Founder and for 40 years publisher of American Artisan and Hardware Record

April 26, 1859 May 4, 1920

The Editor's Page

Getting Behind the Master Brand Sheet

SHEET metal contractors should rejoice at the fact that the Sheet Steel Trade Extension Committee has sponsored the production of the Master Brand sheet.

For a long time it has been known within the sheet metal industry that very little progress could be made in the industry until a guaranteed quality product was placed on the market with which the contractors could go to their prospective customers and say, here is a product which not only has my own personal backing, but that of the entire industry and the sheet steel mills to boot.

Now the "Tinner's" dream is a reality. He can now go out and sell Master Brand sheets to his heart's content, with never a fear that the product will go back on him when put to the real test of endurance.

Of course, the Sheet Steel Trade Extension Committee did not originate the idea of a guaranteed sheet, such as the Master Brand is. The Michigan Sheet Metal and Roofing Contractors' Association has had its Michigan Standard for quite some time—whether or not the idea was original with them is beside the point. The truth is that any sheet metal contractor who has used the old bromide about not being able to sell sheet metal because he could not guarantee its durability will have to take a back seat, in order to make room for his more aggressive brother from now on unless he wakes up and gets out after business.

What the Michigan Standard has done for the sheet metal contractors in the state of Michigan, the Master Brand of the Sheet Steel Trade Extension Committee will do for the contractors in every state in the Union. The committee is a powerful organization. Its potential strength for doing good for the industry is almost limitless. Any product behind which it puts its name is backed by the strongest surety there is. The sheet metal contractor who fails to get behind this brand of sheet metal is only doing himself an injustice. He must realize this.

In Michigan, where the Michigan Standard brand has been in use for a considerable length of time, the industry is coming back into its own. A ride on the interurban train from Grand Rapids to Battle Creek, which the writer took recently, revealed the fact that the wood shingle or paper-covered roof of both farm building and residence is the exception, while the standing seam sheet metal roof is the rule.

Sheet metal contractors have got to get behind a guaranteed brand like the Master Brand and push. The mills can perfect the product and guarantee it lasting qualities, but they cannot go out and do the selling of it for the contractor. There is no substitute for personal representation and the contractor is the representative of the mills.

Putting Fire Loss Figures to Work Selling Sheet Metal

IF Illinois keeps up its fire loss record at the rate established the first three months of this year, the total loss for 1926 will approximate $37,500,000, which would be a new high loss record for the state, according to State Fire Marshal John G. Gamber. The property loss in Illinois last year amounted to $28,517,700, which was the highest annual loss by fire up to that time.

Classes of property suffering the most severe losses in March were as follows: Factories, $1,444,046; stores, $617,739; dwellings, $595,104; warehouses, $435,577.

Of the known causes of fire, electricity caused the largest loss during March, with $443,367. Other leading causes were: Sparks on roofs, $155,691; exposure, $148,365; rubbish and litter, $128,700; stoves and furnaces, $116,907; chimneys and flues, $106,890. These are the figures.

Note that of this loss $595,104 represents the loss in private dwellings; sparks on roofs caused $155,691 damage; defective flues and chimneys caused $106,907 damage. These latter figures represent losses during the month of March of this year in one state. A slight stretch of the imagination will aid in giving an estimate of what the annual fire loss amounts to. Of this it is also seen that sparks falling on unprotected roofs make up no inconsiderable portion in the great destructive action.

From these figures it is seen that the sheet metal contractor still has an excellent argument in favor of some form of sheet metal roof.

The form of advertising which embodies facts revealed by some person of authority such as the state fire marshal is not a new one. It has been used successfully for a long time, but its value as a business producer is unquestioned. Other industries have used it with great success.

Sheet metal contractors who are desirous of increasing their business cannot very well afford to neglect to use such valuable information. It is excellent sales talk. It brings the prospect to his senses with a start.

It seems that in spite of all that can be done to cut down this enormous fire loss, it mounts each year. Therefore anyone in the business of selling and erecting fireproof materials should, by this fact alone, be encouraged to even greater activity. By so doing you will render a real service.

A well coördinated window display, newspaper and direct mail advertising campaign embodying a group of figures such as those given will go a long way toward prejudicing home owners in favor of tight flues for their furnaces and metal roofs for their dwellings and factories.

Animal Shelter Ventilating Needs Sheet Metal Contractors' Opportunity

Describing Proper Location of Air Flues and Roof Ventilators

By HENRY GIESE, Agricultural Engineering Section, Iowa State College, Ames.

ONE of the most important problems on the farm today is the ventilation of animal shelters. Much time and effort have been spent in producing higher types of livestock to increase productivity and profit. These high-producing birds and animals require better housing facilities than their ancestors were forced to get along with. True enough it is a healthy hen that can live in the trees and survive the winter, but she is not the one who produces 200 eggs per year. It has been said that even a crow lays eggs in April and May so what has a hen to her credit if she does no better. Better livestock deserve better buildings. Better buildings deserve ventilating systems. The newer buildings are built tighter and less air filters through than could through the older ones. However, natural infiltration of air is uncertain, drafty and generally unsatisfactory. When the air is warm and still, practically no circulation takes place while on the other hand, when the weather is cold and windy, an excess of air blows through the building and the livestock are chilled.

One of the first essentials of a good ventilation system is that it provide an adequate supply of fresh air at all times. This does not mean that this is the most important factor. In fact, it is an interesting fact to note that as regards the ventilation of public buildings, no considerable group of scientists have ever attributed the bad effects of poor ventilation to a lack of oxygen.

In its extensive study of the ventilation of school buildings, the New York Commission on Ventilation has decided that harmful effects of poor ventilation are due to physical rather than chemical properties of the air. Temperature, relative humidity, and rate of air movement are the vital factors to be considered in ventilation. Recent tests at this institution would seem to indicate that the same conditions hold true in regard to farm livestock although the range may be considerably different.

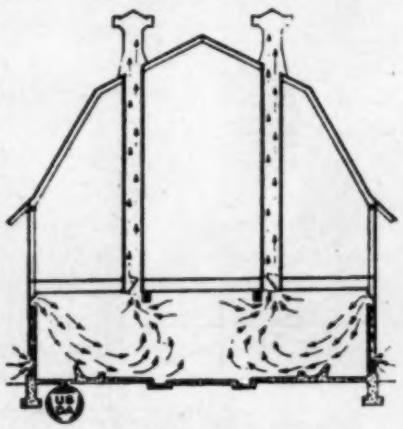


Figure 1. Modified King System of Ventilation

The body may be likened to an engine operating at a constant temperature. Food and air taken into the system are burned and generate heat tending to increase the body temperature. This is balanced by radiation from the body surfaces and the evaporation of moisture from the skin. Under ordinary circumstances the body is able to vary these factors and bodily comfort results. However, extremes tending to upset the balance beyond the power of the body to adjust itself automatically, cause discomfort.

Temperature of course has a direct influence upon comfort. Relative humidity acts in much the same way. By relative humidity we mean the ratio of the moisture in the air to the amount that the air will hold at any specific temperature. That is, if the air has half as much moisture as it will hold, we say its relative humidity is 50%. Water in changing from liquid to vapor form must take up a large quantity of heat. As the moisture evaporates from the body surfaces, it takes this heat from the body and in this way functions as one of the factors tending to lower the body temperature. The less moisture in the air, the greater its capacity to take up more and hence if two rooms are kept at the same temperature but at different relative humidities, the one in which the relative humidity is lower will seem cooler to the body. The rate at which the air is moving past the body also affects the rate of evaporation and in that way exerts its influence on body comfort. A good ventilation system, then, should so control these factors as to maintain body comfort.

In addition to the effect on the animals, a lack of ventilation means wet walls and ceilings. This in turn means decayed timbers, spoiled feed and other evils. A good ventilation system should keep the timbers and feed reasonably dry.

Methods of Ventilation

Several methods of ventilation are available. The one most commonly used in public and industrial buildings is the forced or fan system. This is positive in its action and produces nearly uniform results. It has, however, not gained much favor in farm structures because of the expense of operation and because many farmers do not have electrical energy available.

The systems now commonly used in animal shelters are known as natural system. They are so called because the forces of nature are

*Address on "The Ventilation of Animal Shelters," by Henry Giese, Agricultural Engineering Section, Iowa State College, delivered before the delegates to the convention of the Iowa Sheet Metal Contractors' Association, held at Ames, Iowa, March 22 to 24, 1926.

utilized to produce circulation of air.

It is a well known fact that air expands upon being heated. A rise in temperature of one degree Fahrenheit will increase the volume of 491 feet of air one cubic foot. The weight per cubic foot is correspondingly reduced. Since air is free to flow, this rarefied air is forced upward by the colder and heavier air. The animals constantly radiate heat and thus provide a constant motive force for the circulation of air. It is evident, however, that to secure a definite flow of air in this way, it is necessary to provide flues where the old air can enter and the warm air escape. It is also necessary to conserve the body heat. Heat that is transmitted through stable walls and ceilings does not assist in providing a change of air. Insulation then is an essential for the proper working of a ventilation system using heat as its motive power. With a large number of commercial insulating materials on the market at a reasonable price, it is a relatively simple matter to insulate both walls and ceiling. Ventilating flues must also be insulated to prevent the cooling of the air before it is discharged at the top of the ventilating flue.

Air currents or wind also serve as a motive force in a natural ventilation system. Pressure on the windward side of a building tends to force air through the intakes on that side and the suction of the air flowing past the ventilator head tends to draw air out through the out-takes. To provide best circulation the intakes should be well distributed and provided with back drafters so that the air does not blow across the building and out through the intakes on the leeward side. It is also essential that an efficient ventilator head be provided at the top of the out-take flues.

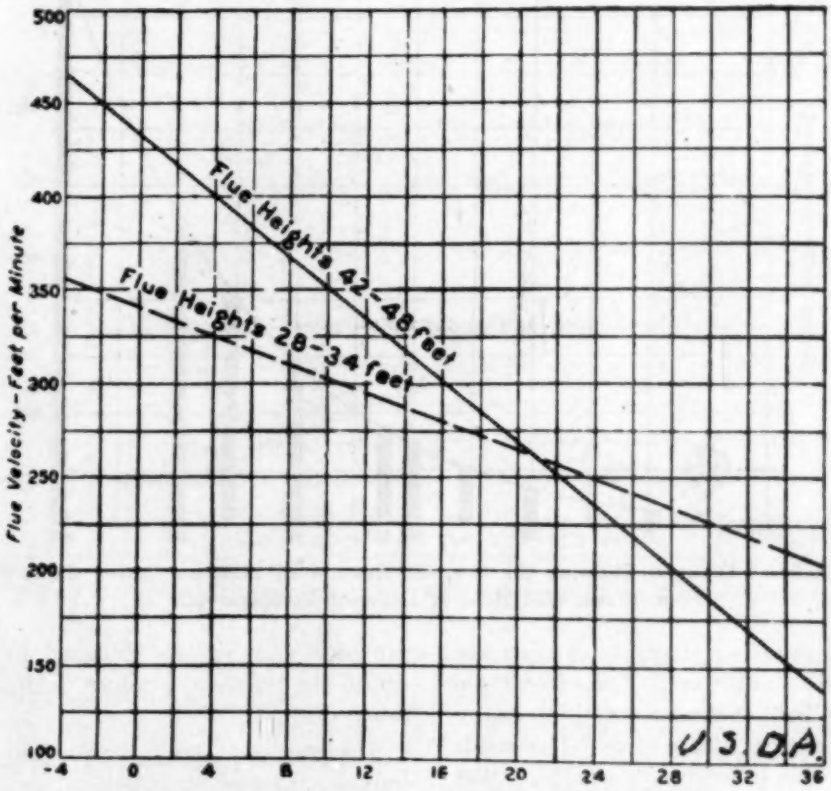


Figure 2. Effect of Outside Temperature on Flue Velocity

While the same factors which govern comfort in the ventilation of human shelters also maintain in animal shelters, there is one respect in which the problems are essentially different. Ventilation being primarily a winter problem we will consider winter conditions. With a zero temperature outside, air is brought into a house at zero temperature and heated artificially to about 72° Fahrenheit. With a normal relative humidity of 80% in Iowa in winter, the incoming air contains 80% of .539 or .431 grains of water to the cubic foot. 7,000 grains weigh one pound. Air at 72° F. has a capacity of 8.5 grains of water. Air that is brought in at 80% relative humidity at zero and heated to 72° has a relative humidity of slightly more than 5%. It has been said that Death Valley, California, is the driest spot on the face of the earth except for the average residence. The comfort zone as far as relative humidity is concerned, is between 50% and 60%. It is then necessary to evaporate a large quantity of water to bring the atmosphere up to a comfortable condition.

Animal shelters on the other hand present just the reverse of this situation. In addition to throwing off some heat, the animals throw off a large amount of moisture in the breath and by evaporation from the skin. A 900 pound cow gives off daily more than 15 pounds of water as invisible vapor from the skin and lungs. A 20 cow stable would therefore have 300 pounds of water deposited in the air daily.

If, as is the case in many stables, the temperature within the stable is practically the same as outside, and assuming that air brought in at 80% relative humidity could be discharged saturated, it would take a circulation of 685 cubic feet per minute per cow or 1370 cubic feet per minute for a stable of 20 cows. On the other hand if the stable is well insulated so that while the temperature is zero outside, the cows are able to warm the air so that it is discharged at 32° and also assuming that it is discharged saturated, it would take a flow of only 44.3 cubic feet per minute per cow or 886 cubic feet per minute for a stable of 20 cows. In other words, if the animal heat is conserved by careful insulation, only one fifteenth as much air is necessary for the removal of moisture as would be if the air left the stable unheated. In addition to this, the temperature is more favorable to animal comfort.

Flow of Air Through Ventilating Flues

Kelley found that while a number of factors such as flue height, difference in temperature between inside and outside affect the flow of air through a ventilating flue, that under conditions of the average installation, the outside temperature is the most closely related. This is assuming a constant production of heat within the stable. He found that below a temperature of about 22° F. the longer flues were most effective whereas above 22° F. the shorter flues became more effective. Kelley also noted that the influence of wind varies with the direction. Wind at right angles to the axis of the barn is considerably more effective than that blowing at an angle or lengthwise. The reasons are possibly two-fold, since the intakes are usually placed on the sides of a barn.

First, a wind from the side flows directly into the intake flues whereas that from the end blows past them and second, the wind from the side is deflected upward by the slope of the roof and probably influences the action of the ventilator. Kelley states that "tests made under field conditions show that the wind has little effect on the amount of ventilation at velocities below four miles per hour and that it is not often a dominant factor until after it exceeds ten miles per hour."

The wind is a decidedly variable factor and is constantly fluctuating from zero to a velocity of thirty miles per hour and often much higher. The average velocity for central Iowa for the four months, November, December, January and February is 7.9 miles per hour or less than experience would show is necessary to be a dominant factor. In fact, owing to its variableness, wind is not in itself a suitable source of power for the ventilation of animal shelters.

Most ventilation systems are built on the assumption of a flue velocity of 250 feet per minute. This is a conservative allowance for mild weather and must be throttled down in severe weather. On this basis, out-take flue areas are usually taken as follows:

Cow .....36 square inches
Marketable size hog, 12 square in.
Sow and litter..36 square inches
Hen .....1 square inch

Ventilator Design

Not the least in importance of the various parts of a ventilation system is the ventilator head. The old fashioned wooden cupola is being gradually but surely displaced by the sheet metal cupola of commercial manufacture. Too often these are built to meet competition rather than to render service. The result of this practice is a ventilator that is actually worse than worthless. Our extension declares that fully 90% of the ventilators now on farm buildings in Iowa back draft particularly when the wind strikes the building broadside. This does not mean that 90% of the firms making ventilators make improperly designed ones. It does mean that the farmer who has been taught the value of ventilation not only by his state college but by dear experience as well, is not and cannot be qualified to judge to quality of a ventilator and is very largely influenced by price.

Calderwood and Mack of the Kansas State Agricultural College have made extensive tests of various types of ventilators under the influence of wind. These were in turn placed in a wind tunnel and observations made of the air movement induced through the ventilator. They divided automatic ventilators into four general classes as follows:

Plain stationary, stationary siphoning, plain rotary, rotary siphoning—according to whether they were so constructed as to turn with the wind and also whether they provided with siphons designed to utilize the wind to produce additional draft.

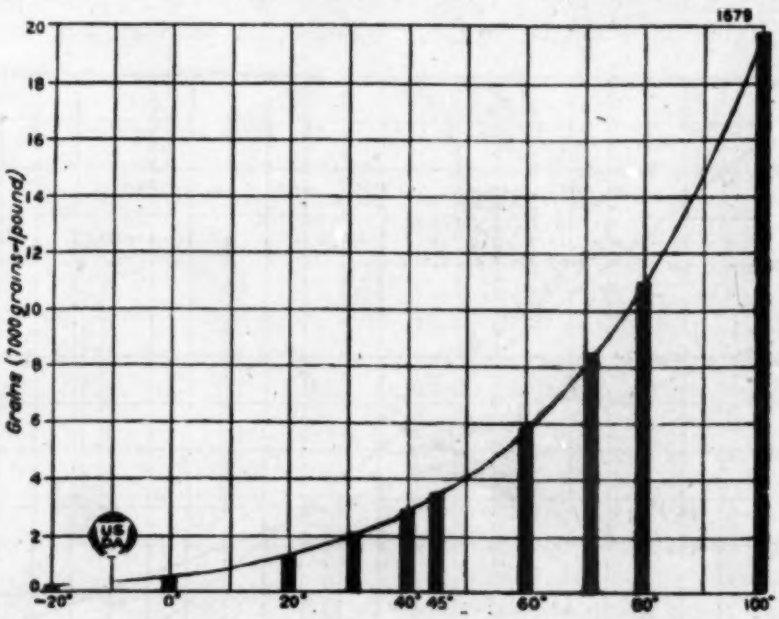


Figure 3. Diagram Showing the Greatest Amount of Moisture that a Cubic Foot of Air Will Hold at Different Temperatures

The results of their tests would indicate that while individual design plays an important part in ventilator design still the average of all those tested show that the rotary is more efficient than the stationary and the siphoning more efficient than the plain. In order of efficiency beginning at the bottom, they are plain stationary, stationary siphoning, plain rotary and rotary siphoning. One interesting fact that should be noted is that a plain open pipe with no ventilator showed an efficiency greater than either the plain stationary or the stationary siphoning, quoting from their report—

"The results of this investigation seem to indicate that the most effective action in inducing air through a ventilator is the vacuum

produced in the wake of the wind. Those ventilators which showed marked effectiveness in these tests took advantage of this principle. Those ventilators which presented a large obstruction to the wind, other factors being the same, gave better results.

Basic Principles of Ventilator Design

Probably the greatest contributing factors to the effectiveness of automatic ventilators are:

1. Large projected area exposed to the wind. A large area produced a larger low pressure area and a better exhaust.

2. Ample area of the exit passages. The area for the passage of the air leaving the ventilator should be at least as large as the cross sectional area of the inlet pipe. In the case of the stationary types of ventilators, the area should be larger, as most of the exhausted air passes out of the ventilator on its lee side when the wind is blowing.

3. Preventing the entrance of wind. Air which enters the ventilator must be exhausted and unless provision is made for the removal of this additional air or the preventing of its entrance, the capacity of the ventilator is proportionately decreased.

4. The straightness of the path of egress of the air. Abrupt turns in the passage of the air introduce friction. The path of the outgoing gases should be as nearly straight as possible. If turns are necessary, they should be smooth and well rounded.

5. The freedom of obstructions in the path of egress. The effectiveness of a ventilator may be materially lowered by obstructions. They should, consequently, be eliminated to the greatest possible extent.

6. Making use of the vacuum created by the wind. Any provision whereby the vacuum created by the wind is increased or made more effective will produce added ventilator effectiveness."

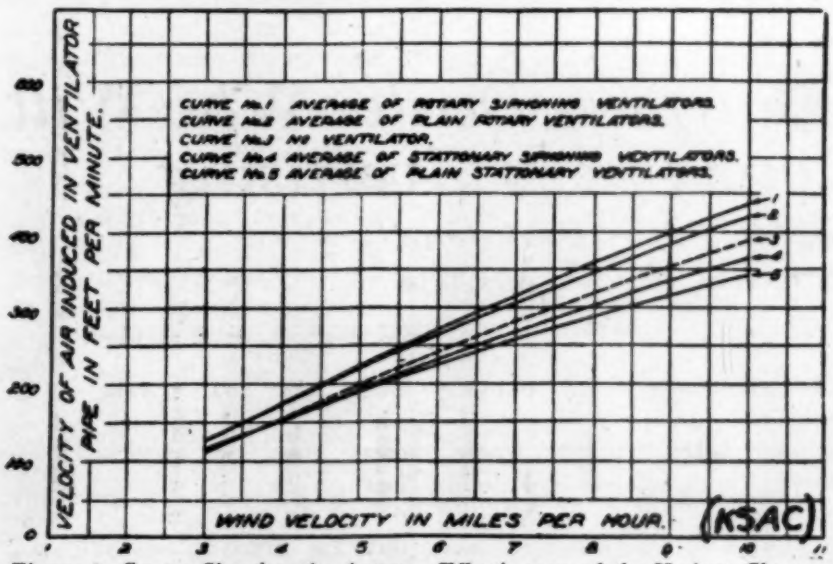


Figure 4. Curves Showing the Average Effectiveness of the Various Classes of Ventilators.

To summarize then, several types of ventilating systems have been proposed but only two, the King system, and a combination of the King and Rutherford systems are in general use in this section. They are adapted for use in practically any type of barn. The principle of the King system is that the foul air of the barn, being heavily charged with carbon dioxide and moisture, is heavier than pure air and sinks to a low level in the barn. Consequently, the intakes deliver the fresh air near the ceiling while the outlets take the foul air out near the floor.

The Rutherford principle is the reverse. The outlet opening is at the ceiling and the fresh air inlets are placed near the floor. This system is extensively used in Canada but not in the States. A combination of these systems, combining the best features of each, has been developed which is coming into general use and is proving successful.

This system removes the foul air from the ceiling and brings the fresh air inlets in near the ceiling.

The following are some of the conditions necessary for the success of these systems.

(1) The barn walls, including windows, and ceiling should be as nearly airtight as possible, consistent with good economy. This prevents the entrance or exit of air through undesirable channels from interfering with thorough ventilation. Where air can pass through openings other than the regular ventilating flues, ventilation cannot be carried out efficiently. An open or broken window will interfere with a ventilating system and often makes it useless.

(2) The material of which the walls and ceiling are constructed should be poor conductors of heat. This aids in maintaining the difference in temperature between the air within the barn and the air outside and so assists in ventilation.

(3) The outlet flues should be air tight construction and their walls built of material that is a poor heat conductor. This prevents too rapid cooling of the foul air as it goes out and minimizes the risk of moisture condensing within the flues.

(4) The foul air outlets should be so located as to insure thorough diffusion of the fresh air throughout the stable, leaving no "dead" spots of foul air at the ends or sides of the barn.

(5) The fresh air intakes should be airtight, not more than 12 to 14 feet apart, and have a combined capacity slightly exceeding that of the out-takes.

(6) The inlets for the intake flues are about midway between the floor and the ceiling, or slightly lower, while their outlets are within eight inches of the ceiling.

(7) In practice it is best to have the inlet flues of comparatively

small size while a smaller number of larger flues are used for out-takes.

(8) Where the cows face out, the air enters within eight inches of the ceiling at the walls and is taken out by the flues located at the floor near the center of the barn for the King system and at the ceiling for the new system.

(9) Where the cows face in, the fresh air enters through pairs of registers in the center of the ceiling— one for each side of the barn —and is taken out through the out-takes located at the walls.

(10) When the barn does not contain the number of animals for which it was designed the intakes may be partially closed to restrict ventilation proportional to the number of cattle in the barn. There must be a sufficient number of cows present to generate the heat necessary to maintain the difference in temperature between the air in the barn and that without the barn, otherwise ventilation will not be efficient.

A ventilator should be placed on the top of the out-takes flues. A good ventilator should have the following qualifications:

1. It should not interfere with the natural circulation of air due to temperature differences.
2. It should be free from back-drafting regardless of the direction of the wind.
3. It should be bird proof.
4. It should be durable.
5. It should be reasonable in price.
6. It should present a good appearance.

These points should be given careful consideration.

Designating the Furnace Dealer Who Will Profit by Consumer Advertising

Must Install According to Standard Furnace Code

By L. Wayne Arny, Director Public Relations, National Warm Air Heating and Ventilating Association

AT THE St. Louis convention of the National Warm Air Heating and Ventilating Association on April 13, 1926, an appropriation was made for publicity and advertising for warm air heating. This action followed long discussion, during which all phases of the subject were given very thorough consideration.

From that discussion several major ideas which have a very important and direct bearing both upon the ultimate success of the proposed campaign and also upon the immediate future of the industry were established. Most important of these, perhaps, was the conviction that warm air can be made a standard and accepted means of home heating in this country and Canada; that its advantages over all other means of home heating are so evident that success will follow in direct proportion to the amount of education which the general public receives. Secondly, that various conditions in the industry make this a most opportune time to begin such a campaign; that a year ago would have been premature, and a year hence unnecessarily late. And, thirdly, but by no means last in importance, that both factors interested in the industry, manufacturers and dealers, must coöperate on a broad basis of mutual interest to reach the common goal in the shortest possible time.

L. Wayne Arny, Director Public Relations.

Since the endorsement of the appropriation at St. Louis many dealers have expressed an interest in knowing what form the campaign would take; how it would tie in with their local problems and increase their own particular business. While it is too soon to discuss the campaign in its details, there are certain policies which will be adopted and which should come to the attention of every warm air furnace dealer now, so that he may receive the utmost benefit from the campaign in his own territory.

In this connection it can be said that consumer advertising must tie in very closely with the dealer. The home builder who wants a warm air system must be able to find a dealer near at hand who will supply him with one and do it in certain recognized ways. This means that there will be developed during the campaign a coördinated effort between the dealer and the consumer.

For a dealer to receive the maximum benefit from the coming consumer campaign he must first of all be a Code dealer; that is, he must be enthusiastic enough about the Standard Code to use it on every installation which he makes where it is at all possible. Secondly, he must sell his heating systems on a

quality basis and not on price. This applies regardless of whether it is a home owner or a contractor who buys.

If a dealer decides that such a policy is impossible, that he would lose too much business by it, that is evidence that he is not the sort of dealer who can be tied in with any national consumer campaign.

There are hundreds of warm air furnace dealers in the country who are getting enough profit on each sale to justify them following the Code every time. It is being done, day after day in all parts of the country. These men are salesmen, they are not afraid to turn down a job when it means cheap work and no profit; they are keen enough to see that the contractor can be made a profitable customer once he is shown that a Code job with its guaranteed heat increases the value and salability of the homes he builds. They are also good enough installers to have the large majority of their jobs give satisfaction immediately after they are installed—not several weeks after when extra service expense has been added to the final cost.

Special effort will be made in the coming advertising campaign to limit its advantages to dealers who can be relied upon to do the following things:

1. Install according to the Standard Code.

2. Sell on quality only and not price.

3. Turn down every job which has to be sold so low that it cannot be installed according to the Standard Code.

From this advertising also, there probably will be numerous inquiries from interested home builders and other live prospects. These will be referred by the publicity office of the association only to those dealers who have signed the Code pledge. This was the original understanding when the Code Pledge cards were first sent out and it will be adhered to during the campaign. At the present time about 1,030 dealers have signed the pledge. The cards are on file in the publicity office and will be used to refer inquiries that follow the advertising.

It is, therefore, important that all dealers who are in sympathy with the ideals under which the advertising campaign will be conducted, that is, code installations throughout and quality salesmanship, sign the Code pledge if they have not already done so. Cards for this purpose may be obtained either through their manufacturer or direct from the association headquarters at 52 West Gay street, Columbus, Ohio.

Frontispiece of Booklet Reduced 2½ Times

The association has recently published a little booklet describing the advantages of warm air heating entitled "Putting Comfort in the Home." This was designed for the consumer and as a medium whereby he may have facts upon which to base his choice of a heating system. Write to your manufacturer and have him send some of these booklets to you, then distribute them among your prospects and follow it up with a personal call. If the prospect happens to be a contractor so much the better. It will give you an opportunity of telling him how much value he can put into his house by installing a warm air system according to the Standard Code. This will prove an effective way of keeping your prospects active until such time as the consumer advertising appears.

Lists Nine Reasons Why Prosperity Is Here to Stay

Prosperity will continue indefinitely and with increasing business, according to J. Laurence Laughlin, professor emeritus of political economy at the University of Chicago, in an article on the "Industrial Outlook" published in the current issue of "The Journal of Political Economy." He cites these reasons:

"1. Little or no speculation in carrying goods for a rise; low inventories, but with some signs of an increase. 2. Low rates of interest. 3. Fair, average harvests. 4. Production in some cases nearing capacity. 5. The greatest number of railway cars loaded in our history. 6. An enormous increase in bank clearings, which goes with increasing production and greater exchange of goods. 7. Lower taxes. 8. The funding of European debts. 9. Increasing economic activity and purchasing power in Europe."

B. F. Sturtevant Company Issues Attractive Product and Property Folder

The B. F. Sturtevant Company, Boston, has issued an attractive little folder entitled "A Nation-Wide Service in Air Engineering." The piece lists some 75 or more products made by the company, in addition to giving the city and street address of the 30 odd B. F. Sturtevant Company locations. Illustrations of the parent plant at Highland Park, Boston; the Wisconsin, Berkeley, California; Galt, Ontario; Camden, New Jersey, and Framingham, Massachusetts, are also shown.

Graves Supply Company Head Dies After Life Devoted to Service

The host of friends of George W. Graves, president and treasurer of the Graves Supply Company, Cincinnati, Ohio, will be sorry to learn of the death of Mr. Graves.

Mr. Graves had been connected with the gas stove industry during the greater part of his industrious life.

The Graves Supply Company, manufacturers of Nosee gas appliances, are successors to the Graves Supply Company of New York and the Mers Gas Stove Company, Cincinnati.

Throwing a Thousand Dollars Into the Warm Air Furnace

Re-Circulated Air in Warm Air System World's Greatest Money Maker

By GEORGE BOEDDENER, The Fox Furnace Company.

SOUNDS foolish? Wait!

It is conceded by the warm air heating industry that the use of basement air is extremely wasteful of health, comfort, happiness and the home owner's pocketbook. I do not propose to dwell upon the ravages of basement air in its disastrous relationship to the health, comfort and happiness of the home owners who use this system. This for the reason you can appeal to a person's pocketbook and then automatically show them the way to these vigorous attributes.

It is reasonable to state that the average 6-room home using basement air will consume at least ten tons of a fairly good grade of soft coal during one entire heating season. This figure is conservative, based on the experience of others and myself. Estimate the price of coal at $8 per ton and you have a grand total for the heating season of $80. A conservative estimate of the percentage of saving which can be made by the installation of one or two cold air returns is 30 per cent. Some men connected with the warm air heating industry estimate savings as high as 40 per cent. However, based on the more conservative 30 per cent figure, the actual amount saved at the end of the first heating season after cold air returns have been installed is $24 plus interest at 6 per cent or $25.44. At the end of the second year add the first year saving with interest or $25.44 plus the saving on the coal bill of $24 for the second year plus interest at 6 per cent on the entire amount which makes a total of $52.42, etc. At the end of the twenty-first year the accumulated sum in principal and interest is more than $1,000. This is from an original investment of from $35 to $90 in cold air returns. Whose business or profession or what kind of business or profession can show such tremendous profits?

End of		Interest at 6 %	Total
First year	$24.00	$1.44	$25.44
Second	49.44	2.98	52.42
Third	76.42	4.58	81.00
Fourth	105.00	6.30	111.30
Fifth	135.30	8.11	143.41
Sixth	167.41	10.04	177.45
Seventh	201.45	12.08	213.53
Eighth	237.53	14.25	251.78
Ninth	275.78	16.54	292.32
Tenth	316.32	18.97	335.29
Eleventh	359.29	21.55	380.84
Twelfth	404.84	24.29	429.13
Thirteenth	453.13	27.18	480.31
Fourteenth	504.31	30.25	534.56
Fifteenth	558.56	33.37	591.87
Sixteenth	615.87	36.95	652.82
Seventeenth	676.82	40.60	717.42
Eighteenth	741.42	44.48	785.90
Nineteenth	809.90	48.59	858.49
Twentieth	882.49	52.94	935.43
Twenty-first	959.43	57.56	1,016.99

What kind of bank or mortgage company could possibly sell an investment like this? Where is the gilt edge common stock that could duplicate this performance?

Mr. Warm Air Heating Man, wherever you may be, Think! Think! Think! Get out of the category of the warm air heating business, throw away your overalls, dress up, use Rolls-Royce manners and sell the best investment in the world. Don't worm your way to the back door; bounce onto the front porch, stamp your feet, ring the door bell, step back three feet while the lady of the house comes to the door, be courteous, and then step up and present your business card. Talk re-circulatory investment. Use the above figures or make up your own if you do not agree with mine.

Let's get off on the right foot and sell re-circulated air investment (the term re-circulated air sounds warm —is warmer than cold air) but for heaven's sake don't hang re-circulatory returns on a diseased hot-air system. You know the symptoms and you know the cure. I'm yelling this at you now so you'll hear it and so I won't have to repeat it. The cure is the Standard Furnace Code.

The question might arise as to why I have figured the investment over a twenty-one year period. For twenty years the saving is $935.43, but for twenty-one years $1,016.99. To me a thousand dollars sounds like five hundred dollars more than $900. A shirt at $4.98 seems like a whole lot less than the same shirt at $5. Will the heating system last that long? Certainly—if you have done your job right. How do I know it will? Because twenty-one to thirty-five years ago some furnace men all over the United States installed some long-winded warm air systems. Get that? Warm air systems. True, a lot of them were put in with outside air and are still performing that way, and some of them have been changed over to the re-circulatory system, but the jobs are satisfactory because the warm air and cold air pipe capacities and the furnace were properly proportioned for the job. The furnaces on those jobs have had a real chance to breathe. To the warm air heating industry what might be classified as the world's greatest handicap has now been removed through the presentation of the Standard Code.

Any other savings? Yes, lots of them. Dust and dirt from the basement necessitates frequent decorating expense. The furnace cannot possibly get enough air to give long life to the castings. Result—repair bills or possibly a new furnace. The hot air from the furnace cannot travel through the warm air pipes fast enough. Result—a very large portion of the hot air has to radiate through the furnace casing. Result—after it comes through it does not know where to go; it remains in the basement. Result—basement

temperature of from 60 to 85 degrees. Result—the lumber dries out beyond reason—it squeaks because it's being mistreated (burglars in the house). Half of ten tons of coal used to heat the basement—possibly two tons for creating and maintaining a draft and the three remaining tons of coal were finally pushed to the first and second floors. Yes, sir! That's the "baby" they have in that house using basement air. Hundreds of thousands like it. Think of the money it costs in those thousands of homes to push three tons of coal to the upper floors through the entire winter.

Save the backaches of the hundreds of thousands—save the worry, the expense, increase health and happiness, be helpful to humanity. Sell the world's best investment—cold air returns—pardon me—recirculated air.

Bill Finds Way to Construct Advertisements With Pulling Power

Neglects to Mention Standard Furnace Code, But "Struts His Stuff" Nevertheless

THERE is no gainsaying the fact that any man who wills to do a thing can find the means to do it, provided he sets about it in the right.

Down in Grand Island, Nebraska, there is a man—a furnace installer—Bill by name—who wills to advertise the warm air heating industry. Now Bill is not an advertising copy writer in the strict sense of the word, but he is an advertiser. He knows that a warm air heating system has certain definite advantages over any other system, because he has thoroughly analyzed the system. He also knows that these particular advantages are just what the home owner needs and has been looking for.

Bill knows that his story must play up these particular advantages. But Bill is not an adept in the use of the king's English and for that reason he finds difficulty in telling his story in the words of a college professor. Nevertheless Bill is nothing daunted. He is observant. When he sees an automobile ad or a listerine ad or an ad for school girl complexion cream which he thinks he can change sufficiently to meet his own needs, he is not adverse to lifting a line here and another there, patching them together and producing an advertisement that will exactly fill his requirements.

Bill's full name is William Hehnke and he is the Hehnke portion of the Hehnke - Lohmann Company, 210 West Second Street, Grand Island, Nebraska. The accompanying advertisement illustrates very effectively how well Bill has succeeded in getting just the right slant on the story he wished to put over. He is not an advertising copy writer, but just a furnace installer who employs common sense in his work. Bill is very modest and makes no claim to originality. He frankly admits that he "lifted" the "stuff" from several other ads. But he must be given credit for having sufficient gray matter and common sense to know how to go about getting what he wanted.

The advertisement shown is one of a series of four which Bill used during one month, placing one in the local paper each week. At the end of the month he put the four ads together, ran them off on a page and mailed them out to a selected list of prospective furnace buyers.

Bill believes absolutely in selling furnaces the health, comfort and economy way. He says when you start talking about furnace construction in the ad, people are apt to get suspicious. They think your

Illustrating One of Bill's Quartette Series. They Got the Orders

product is cheap. Bill is right on that score. Why should anyone have to spend a lot of time explaining furnace construction to the lady of the house? If you tell how the furnace will protect the health of her family during cold weather she is more apt to respond—and with reason.

No, Bill has done a good job, and his ads pull the business. Try his tactics. You'll get results.

There's only one thing that Bill forgot and that is to mention the Standard Furnace Code in his ad. If he had done that there would be absolutely no bone to pick.

W. E. Hull Likes Our Fight for Better Furnace and Sheet Metal Work

To AMERICAN ARTISAN:

In your issue of April 10, 1926, you show the first floor plan of a 6-room bungalow and the method of determining the pipe area for each room. I should like to call your attention to the northeast bedroom which is computed to have 61.27 square inches of warm air, including the 15 per cent which must be added for northeast exposure. You have used a 10-inch pipe, while a 9-inch pipe carries 63 square inches.

I enjoy the fight you are putting up for a bigger and better furnace and sheet metal business.

United States Register Has New Catalog Available for Distribution

The United States Register Company, Battle Creek, Michigan, makers of warm air registers, have issued a new catalog No. 20. The booklet is descriptive of the latest developments in steel and wooden registers made by the company. The book is now available for distribution and a copy of it can be had by directing a post card to the company at Battle Creek, Michigan.

George Gamble Explains Why Bates and Lee Plans Won't Work

To AMERICAN ARTISAN:

When I sent in my opinion on the Mr. Eickelberg's difficulty, I did not expect to get into an argument about it; but since you have asked me specifically, I will tell you why I do not think Mr. Bates' plan or that of Mr. Lee will work. The living room ceiling is as high as the entire house and we all know that you have to heat a room from the top down. Therefore, if you leave the bed chamber and back room doors on the second floor open, these will get warm before any start is made on the heating of the living room. For this reason the doors in the bed chambers and bath room will have to be kept closed, while some other provision for taking the cold air out of them will have to be made.

GEORGE W. GAMBLE.

"Will It Pay" Good Yard Stick to Use on Proposed Expenditures

Leaks Must Be Plugged and Accurate Accounts Kept at All Times

By ROBERT L. ALEXANDER

WE ARE all in business with the object—perhaps I should say hope—of making a fair and reasonable profit. Therefore a "leak" may be defined as something in the conduct of a retail hardware store that causes the profit, when we come to look for it, to be less than we expect or believe we have a right to expect.

A great many leaks may be eliminated by simply following up just a little farther—just a little more carefully—than we do now and that the difference between success and failure in any one point is very small.

They tell a story of the great artist, Michael Angelo. A young pupil, watching the master at work, said to him, "Master, why are you so particular about trifles?" and the master replied, "My son, trifles make perfection and perfection is no trifle." Of course, the moral usually drawn from this story is obvious, but it seems to me that there is another lesson hidden here also. It is that when perfection—or success—is split into the many trifles of which it is composed, it requires but little more effort—but little more care—to do our best to master that point. It required very little more care on Michael Angelo's part to be sure that this color was he left it.

I sometimes question whether just right—that line just so—before painstaking care is not often miscalled "genius."

I believe I have "cussed" the income tax more than any man in this room, because my business has brought me in contact with greater quantities of it. But there are many good things to be said for the income tax—after it is done for the year. For instance, it compelled the average retailer to keep much better records of his business, and consequently he knows much more of its strength and weakness today than he used to. No longer can he keep records as did Henry Squires at his cross roads store. Poor Henry couldn't read or write, so he kept his books by a peculiar system of his own. One day Si Perkins came in and said, "Well, Hen, how much do I owe you?" Henry fumbled through his ledger and, after scratching his head a bit, finally announced a total to which Si took prompt exception and demanded the items. Hen rattled them off fluently enough, ending with "one cheese." Si said, "By gum, Hen, I knew you had made a mistake. I hain't never got no cheese off'n you." Henry was much taken back for a moment, but soon he brightened and announced, "Oh, I see it now, Si. It's a grindstone and I just forgot to put the hole in it."

Let us consider for a moment how much further we must go than the income tax compels us in order to determine what our real profit

may have been. Your Uncle Sam wants to know the total profit of you—John Smith—as an individual, rather than that of John Smith as a hardware man. For instance, if you have a property three squares down the street from your store and sell it at a profit of $4,000, the government is keenly, and rightly, interested in that profit, but all of us know enough to disregard it in considering the profits of our hardware store.

Similarly on our income tax return we cannot charge interest on our investment into expense, because that is a profit of the individual, but the hardware store profit is not correct until this has been deducted. Once when I was traveling, one of my cusotmers let his account run considerably behind, and the member of the firm who attended to credits asked me to take the matter up with my customer. I was very much impressed by the fact that the customer did not attempt to give me any stall, but boldly announced that he knew he was behind and he was afraid he would be more or less tied up for some time yet, concluding with the magnificent announcement that "it was all right—we could charge him interest." When I reported to the "boss," he said, "Of course we will charge the interest under the circumstances and hope we will eventually get both principal and interest, but even if we do, that won't make it 'all right.' I wish you would try to explain to these fellows, Bob, that if 6 per cent on our money was all we needed to live on we would no longer work all day and worry half the night, but would sell out, put our money in mortgages and retire."

I think you get my point, though if you ever tried to sell the idea to a debtor, you'll admit that part isn't easy to do. Anyway, remember that your real profit consists only in the excess return over what your capital would bring if invested in mortgages and if you fool yourself you are hiding a lot of leaks.

Now take the question of proprietor's salary. Suppose you have been drawing $50 per week as head clerk for someone, but are about to take your little all and venture for yourself. You reason quite properly that your capital is small and the start will be pretty hard, so you resolve not to draw one cent more from the business than you can help, until it gets on its feet. All quite correct as far as it goes, but no matter how little you draw, you should credit yourself with $50 salary each week. You will have only your gain above that amount to recompense you for the worries and risks of proprietorship and that is all that can be properly called a profit. Of course, under these conditions you will very likely show a loss instead of a profit, but you haven't fooled yourself and are in a position to look for the leaks, and the loss is deductible on your income tax return, anyway.

So it is with the store property which you own. Open up a Building Income and Expense account, charging it with taxes, mortgage interest, repairs, etc., and crediting it with just the rental you would get from another occupant, charging the business in turn with the same amount. At the end of the year it will be clear just how the business made out and the profit on the real estate will show separately, as it should. If you fool yourself, you won't even know *when* to look for the leaks. Thus we get an idea of some of the things we should do to make our bookkeeping tell us the truth. If you have never worked as a public accountant, you would be astonished how many people's books, other than Accounts Payable and Accounts Receivable, are absolutely wrong. And again how many people's accounts, while fairly accurate, are totally useless, because they do not call on them for the slightest guidance. They don't follow through—just spend time and money on bookkeeping, because it seems the usual thing to do—a sort of "keeping up with the Joneses idea." There is no surer way to stop leaks than to keep your records straight, and then use them to steer by.

Only the exceptional man can guess his way to a profit and his would be greater if he had accurate records and guided himself by them.

Not long ago some fellow invented the idea of using a three-legged stool as an illustration. It's a darn good one—and will do for most anything—so I am going to use it. We can liken the big factors that control a profit—Volume, Margin and Expense—to the three legs of a stool. Let us say that the flat top represents "Profit." If the Volume declines, with Margin and Expense remaining the same, inevitably the top or Profit slopes downward. If the "Margin" declines and the other "legs" remain the same, the Profit will surely decline. On the other hand, if Expense increases, down slides our Profit again.

Our analogy now fails, for there is a certain relationship between Volume, Margin and Expense that does not exist between the stool legs. Increasing Volume is apt to increase Expense, or decreasing Expense is likely to diminish Volume. Volume can be increased by decreasing Margin, while raising Margin is likely to decrease Volume.

The trick—and not an easy one at that—of bettering Profit lies in being able to alter one factor without affecting the other two, or at least not affecting them proportionately. Any other course will produce a serious "leak."

I will say little about obtaining more volume, though it is a large subject in itself. Every merchant has quite a few ideas as to how to increase sales—and most of them are right—*if properly carried out.* Let me again warn you, however, to beware of increasing sales at too great a cost in increased expense or in decreased margin, for the result will be a fine large leak, and a decreased profit.

It is astonishing how great a proportion of sales may be made at a good margin in competition with price cutters by talking the points of your own goods and refusing to worry about the other fellow's prices. That is real salesmanship—and you not only sell the goods but sell yourself with them—so that a

satisfied customer returns. This avoids quite a "leak."

Remember that "Mark-up" and "Margin" are two very different things. Careful records will show a surprising difference, even under the most nearly ideal conditions, and between them hide many possible leaks, among which are forgotten or lost charges, pilfering by customers or clerks, etc.

There is one yard-stick—one test—for expense items and that is the three words, "Will it pay?"

It matters not how much or how little you give a clerk if he can pass this test. If he wants more money, the question is not what Brown is paying or what you may have to pay a man to replace him, but rather "Is he worth the money? Will it pay?"

Other items of expense should pass the same test. The question, for instance, as to whether you should spend ½ per cent or 2½ per cent on advertising is solely a question of "Will it pay?" With this yard-stick many a leak can be plugged.

Turnover, too, will have a great effect on profit. Of course, it is possible—and a mistake—to aim for too high a turnover, but 99 men out of 100 still aim more or less too low. The cost of carrying goods varies considerably, but roughly it averages about 1½ per cent a month. That's about the rate at which your profit "leaks" away through the shelf-warmers.

In closing let me warn against the idea a lot of merchants have—that volume is the remedy for all business ills—more sales regardless of decreased margin or increased expense. Instead of being a remedy this "volumitis" is a disease and if allowed to become chronic it is generally fatal.

The man who considers only one point, for instance, Volume—and forgets the way other things may be affected—gets an entirely wrong slant on the situation. He is like the Irishman and the stove. You know a certain hardware man had just put in a new line of improved double heaters and he had a clerk who was very enthusiastic. Now don't ask me where he got an enthusiastic clerk. I don't know, unless he trained it into him—the same as you would have to do. Anyway the clerk dilated on the merits of the stove, stressing the point that it would effect a great saving of fuel. Said the Irishman, "You say that dommed thing will save half me coal?" "That's just what it will, Pat," the clerk came back. "Then, by golly, I'll be taking two and save it all," was the Irishman's announcement.

I hope that you are all as successful in 1926 in stopping leaks as the Irishman expected to be.

Arthur S. Jones, Charter Member of Old Guard, Dies in South

Death has taken another Old Guard Southern Hardware Salesmen's Association member, Arthur S. Jones. Mr. Jones represented the S. H. Wetter Manufacturing Company at South Pittsburgh, Tennessee.

Mr. Jones died at his home in South Pittsburgh, Tennessee, after a long illness. The immediate cause of death was heart trouble. He was a charter member of the Old Guard and had a host of friends throughout the entire southern territory.

Southern Hardware Jobbers Association, Atlanta—Biltmore Hotel, Atlanta, Georgia, May 4, 5, 6 and 7, 1925. John Donnan, Secretary-Treasurer, 821 American National Bank Building, Richmond, Virginia.

Old Guard Southern Hardware Salesmen's Association, Atlanta-Biltmore Hotel, Atlanta, Georgia, May 5. R. P. Boyd, R. F. D. No. 4, Knoxville, Tennessee, Secretary.

American Hardware Manufacturers' Association, Atlanta Biltmore Hotel, Atlanta, Georgia, May 4, 5, 6 and 7, 1926. Frederick D. Mitchell, Secretary-Treasurer, 1819 Broadway, New York City.

Southeastern Retail Hardware and Implement Association, (composed of Alabama, Florida, Georgia and Tennessee) Convention and Exhibition, Atlanta, Georgia, May 10, 11 and 12, 1926. Walter Harlan, Secretary, 701 Grand Theatre Building, Atlanta.

Panhandle Hardware and Implement Association, Amarillo Hotel, Amarillo, May 10, 11, and 12, 1926. C. L. Thompson, Secretary-Treasurer, Canyon.

National Association of Stove Manufacturers, Astor Hotel, New York City, May 12 and 13, 1926. Allen W. Williams, Secretary, 52 West Gay Street, Columbus, Ohio.

Metal Branch of National Hardware Association, Gibson Hotel, Cincinnati, Ohio, May 13 and 14, 1926. W. H. Donlevy, Chairman, 1014 Cherry Street, Philadelphia, Pennsylvania.

Arkansas Retail Hardware Association, Little Rock, Arkansas, May, 1926. L. P. Biggs, Secretary, 815 Southern Trust Building, Little Rock.

Western Warm Air Furnace and Supply Association mid-year meeting, Sherman House, Chicago, May 21 and 22. Secretary John H. Hussie, 2407 Cumming Street, Omaha, Nebraska.

Kentucky Sheet Metal and Roofing Contractors' Association, Kentucky Hotel, Louisville, May 24, 1926. O. E. Hutchison, Secretary, 1526 Christy Avenue, Louisville.

National Association of Sheet Metal Contractors, Louisville, Kentucky, May 24 to 28, 1926. Edwin L. Seabrook, Secretary, 608 East Chestnut Street, Philadelphia, Pennsylvania.

Carolinas Hardware Association, Raleigh, North Carolina, June 8 to 10, 1926. A. R. Craig, Secretary, 717-18 Commercial Bank Building, Charlotte, North Carolina.

Mississippi Retail Hardware and Implement Association, Biloxi, June 21, 22 and 23, 1926. Guy Nason, Secretary Starkville.

National Retail Hardware Association 27th Annual Congress, June 21 to 24, 1926. Herbert P. Sheets, Secretary, 915 Meyer Kiser Bldg., Indianapolis, Indiana.

Retail Hardware Doings

Illinois.

J. T. Amis has opened a hardware store at Dundee.

Indiana.

George W. Baxter and C. L. Todd have purchased the Moore and Remple Hardware Store at 320 Main Street, Lafayette.

W. A. Beasley has purchased a half interest in the hardware store of Fred Crillman at Fairmount.

Iowa.

C. H. Leibsle has sold his hardware business at Conrad to Jensen Brothers.

Kansas.

Bloomer Hardware and Implement Company have sold their business at Holyrood to George F. Brust and Philip Van Meter.

Michigan.

The hardware department of the Square People Store at Menominee has been purchased by Henning Sollin and Harold Eastberg.

Minnesota.

The Kramer Hardware Store at Greenwald has been damaged by fire.

John G. Stadheim has sold his interest in the North Side Store to his partner, William Jenson.

Morrison County Lumber Company will open a hardware store at Randall.

The mark of superior quality on Galvanized Steel Sheets

INLAND "TEC" Master Brand Sheets

Inland "TEC" Master Brand sheets are now available. The Master Brand mark signifies that the sheets bearing it have been manufactured under the exacting specification of the Trade Extension Committee and are subject to constant inspection and test. Inland Master Brand sheets carry a double assurance of uniform quality; each sheet also carries the Inland brand mark.

INLAND STEEL COMPANY

General Offices: 38 *South Dearborn Street, Chicago*

Mills: Indiana Harbor, Ind., Chicago Heights, Ill., Milwaukee, Wis.

Branch Offices and Representatives

St. Paul Seattle St. Louis San Francisco Salt Lake City
Milwaukee Kansas City New Orleans Los Angeles

TERNE PLATE HEADQUARTERS

A brand as old as the Terne Plate Industry in this country—the best that can be made by the oldest and most experienced makers of Terne Plate. Its durability, superior quality and complete satisfaction are proven by its large sales to a host of satisfied users.

FREE—two wall hangers of tables of weights of black and galvanized sheets sent on request.

THE J. M. & L. A. OSBORN CO.

"Everything used in Sheet Metal Work"

CLEVELAND

BUFFALO WAREHOUSE: 64-68 RAPIN STREET

Use ARMCO Ingot Iron for those Spring Jobs

CONTRACTORS who work exclusively with ARMCO Ingot Iron find that jobs are installed quicker—time and labor costs are reduced—because "the purest iron made" is soft, easy to work, and solders so cleanly.

Then, too, our big National Advertising campaign is telling millions of sheet metal prospects that ARMCO Ingot Iron is the purest iron made—that it has durable, rust-resisting qualities not to be found in any other galvanized sheet metal.

Perhaps you would like to know more about ARMCO Ingot Iron—just how it has made bigger profits possible for other contractors—and how it will do the same for you.

A post card addressed to Department D will bring you complete information. Write now.

THE AMERICAN ROLLING MILL CO.
MIDDLETOWN, OHIO

Export: The ARMCO International Corp.
Cable Address: ARMCO, Middletown.

ARMCO INGOT IRON
The Purest Iron Made

Say you saw it in AMERICAN ARTISAN—Thank you!

Current Demand for Steel Shows Slump—Industry Averages 80 to 85 Per Cent of Capacity

Non-Ferrous Metals Quiet — Increased Demand for Lead—Pig Iron Prices Firm

APRIL is ending with the rate of steel mill operations and of incoming new business measurably below those of a month ago, but with no marked changes from the conditions of last week.

As a whole, the industry is probably running at 80 to 85 per cent of capacity, showing that in consumption there has been no abrupt falling off from that of March, says the Iron Age. It says:

"Apart from the seasonal inroad being made on rail and tin plate bookings, the gap between incoming business and shipments is less marked than in late April last year, when mill operations were between 70 and 75 per cent.

"Prices for bars, plates and shapes have been steady in the main, in the face of declining backlogs for the last two.

"In sheets, the weakness of the of mills making the concessions has past month persists and the number increased."

Pig Iron

No concessions in prices of pig iron are reported in Alabama as yet despite the fact that the larger consumers are openly stating that they expect a recession of $2.00 per ton and more.

A little better aggregate of sales was noted last week but the market was not so firm and the selling must be more active to absorb the current make beyond the second quarter.

For this quarter the furnace interests have no apprehension and believe that when the time comes there will be buying for the third quarter. Furnace interests are holding at $22.00 for No. 2 foundry, whereas consumers anticipate $20.00 per ton iron.

Production in Alabama is being maintained and so far very little, if any iron has been placed on the yards.

The make can hardly be increased for a while yet, so far as foundry iron is concerned, and no curtailment seems probable.

A Little later one or more blast furnaces may need repairing.

Copper

Business in copper today was extremely quiet. Inquiries from home consumers were few and a dearth of business was reported from abroad.

One consumer reports to have purchased from producers yesterday at 13.87½ cents delivered in the Connecticut Valley for early shipment.

Most of the large producers, however, are still holding at 14.00 cents delivered for May-June-July shipment.

Demand for refinery positions continues light but prices are without essential change, there being no pressure to sell by second hands who continue to ask 13.85 cents f. o. b. refinery for prompt and April, 13.87½ cents for May and 13.95 cents for June.

Casting copper is steady at 13.50 cents f. o. b. refinery and lake copper is easier at 14.12½ cents delivered.

Zinc

Prime Western is again quotable today at 6.95 cents St. Louis basis, though not very freely offered at that price.

Consuming demand is moderate.

The buying interest continues to be mainly for early shipment, consumers evidently counting upon there being a sufficient stock in producers' hands for their maturing needs.

The stocks are sufficient at present, though some producers are pretty closely sold, but there is certainly no uncomfortable excess.

Brass special is offered at $7.05 St. Louis, but is not in active demand.

Tin

In this market there were sellers at ¼ cent under the prices that were bid at the close yesterday, thus prompt Straits is available at 63.75 cents, May 62.75 cents, June 61.00 cents, July 60.00 cents, August 59.75 cents.

A fair business has been done with consumers on the June, July and August positions, but there has been very little trading between dealers.

There are offers to sell 99 per cent for May delivery at 61.00 cents or 1¾ cents under the price paid for Straits.

Lead

The outstanding feature in the lead market is the large demand for prompt lead, which has advanced prices in the St. Louis market, stocks being decidedly moderate and held at 7.75 cents to 7.80 cents for quick shipment.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $17.50 to $18.00; old iron axles, $25.50 to $26.00; steel springs, $18.50 to $19.00; No. 1 wrought iron, $13.00 to $13.50; No. 1 cast, $15.50 to $16.00, all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper, 9 cents; zinc, 5 cents, and cast aluminum, 19 cents.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $39.75; commercial 45-55, $37.25, and plumbers', $34.75, all per 100 pounds.

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS

PIG IRON

Chicago Foundry	$22 00
Southern Fdy., No. 2, 27 01	28 01
Lake Superior Charcoal	29 04
Malleable	22 00

FIRST QUALITY BRIGHT TIN PLATES

IC	20x28	112 sheets	$25 10
IX	20x28		29 60
IXX	20x28	56 sheets	16 20
IXXX	20x28		17 55
IXXXX	20x28		18 95

TERNE PLATES

		Per Box
IC 20x28, 40-lb.	112 sheets	$27 90
IX 20x28, 40-lb.	" "	30 90
IC 20x28, 25-lb.	" "	22 20
IX 20x28, 25-lb.	" "	25 20
IC 20x28, 20-lb.	" "	20 25
IV 20x28, 20-lb.	" "	23 00
IC 20x28, 15-lb.	" "	16 65
IC 20x28, 12-lb.	" "	15 25

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs.	4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28		$12 60
Cokes, 90 lbs., base, 20x28		12 80
Cokes, 100 lbs., base, 20x28		13 00
Cokes, 107 lbs., base, Ic 20x28		13 30
Cokes, 135 lbs., base, IX 20x28		15 70
Cokes, 155 lbs., base, 56 sheets		8 70
Cokes, 175 lbs., base, 56 sheets		9 55
Cokes, 195 lbs., base, 56 sheets		10 40

BLUE ANNEALED SHEETS

Base 10 ga.	per 100 lbs.	$2 80
"Armco" 10 ga.	per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs.	$3 20
No. 22-24	per 100 lbs.	3 35
No. 26	per 100 lbs.	3 90
No. 27	per 100 lbs.	3 95
No. 28	per 100 lbs.	4 10
No. 29	per 100 lbs.	4 10

GALVANIZED

"Armco" 28	per 100 lbs.	$6 70
No. 16	per 100 lbs.	4 50
No. 18-20	per 100 lbs.	4 65
No. 22-24	per 100 lbs.	4 80
No. 26	per 100 lbs.	4 95
No. 27	per 100 lbs.	5 10
No. 28	per 100 lbs.	5 25
No. 30	per 100 lbs.	6 75

BAR SOLDER

Warranted		
50-50	per 100 lbs.	39 75
Commercial		
45-55	per 100 lbs.	37 25
Plumbers	per 100 lbs.	34 75

ZINC

In Slabs	8 50

SHEET ZINC

Cash Lots (600 lbs.)	13 75
Sheet Lots	14 75

BRASS

Sheets, Chicago base	18⅜c
Mill base	18⅜c
Tubing, brazed base	27½c
Wire, base	19½c
Rods, base	16⅜c

COPPER

Sheets, Chicago base	22½c
Mill base	22½c
Tubing, seamless base	25½c
Wire No. 9 & 10, B & S. Ga.	20½c
Wire No. 11, B. & S. Ga.	20½c

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

LEAD

American Pig	$ 8 60
Bar	9 60
Sheet	
Full Coils, per 100 lbs.	14 00
Cut Coils, per 100 lbs.	14 25

TIN

Pig Tin, per 100 lbs.	71 00
Bar Tin, per 100 lbs.	72 00

ASBESTOS

Paper up to 1/16	8c per lb.
Roll board	6¼c per lb.
Mill board 3/32 to ⅛	8c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6.00 per roll

BRUSHES

Hot Air Pipe Cleaning	
Bristle, with handle, each	$0 85
Flue Cleaning	
Steel Only, each	1 35

BURRS

Coppers Burrs only	45%

CEMENT, FURNACE

American Seal, 5-lb. cans, net	$ 45
American Seal, 50-lb. cans, net	90
American Seal, 25-lb. cans, net	2 00
Asbestos, 5-lb. cans, net	45
Pecora, per 100 lbs.	7 51

CHIMNEY TOPS

Iwan's Complete Rev. & Vent	30%
Iwan's Iron Mountain only	35%
Standard	30 to 40%

CLINKER TONGS

Front Rank, each	$ 75
Per doz.	8 40

CLIPS

Damper	
Acme, with tail pieces, per doz.	$1 35
Non Rivet tail pieces, per doz.	35

COPPERS—Soldering

Pointed Roofing

3 lb. and heavier	per lb.	40c
2½ lb.	per lb.	45c
2 lb.	per lb.	48c
1¼ lb.	per lb.	55c
1 lb.	per lb.	60c

CORNICE BRAKES

Chicago Steel Bending	
Nos. 1 to 6B	Net

COUPLING HOSE

Brass, per doz.	$2 20

CUT-OFFS

Kuehn's Korrekt Kutoffs:	
Galv., plain, round or cor. rd. standard gauge	40%
26 gauge	30%

DAMPERS

"Yankee" Hot Air	
7 inch, each 20c, doz.	$1 75
8 inch, each 25c, doz.	2 40
9 inch, each 30c, doz.	2 75
10 inch, each 32c, doz.	3 00
Smoke Pipe	
7 inch, each	$ 35
8 inch, each	40
9 inch, each	50
10 inch, each	60
12 inch, each	90
Reversible Check	
8 inch, each	$1 30
9 inch, each	1 70

DIGGERS

Post Hole	
Iwan's Split Handle (Eureka)	
4-ft. Handle, per doz.	$14 00
7-ft. Handle, per doz.	26 00
Iwan's Hercules pattern, per doz.	14 90

EAVES TROUGH

Galv. Crimpedge, crated	75 & 5%

ELBOWS

Conductor Pipe Milcor.	
Galv., plain or corrugated, round flat Crimp.	
Std. Gauge	65%
28 Gauge	55%
26 Gauge	40%
24 Gauge	10%
Square Corrugated	
Standard Gauge	50%
No. 28 Gauge	45%
26 Gauge	30%
Portico Elbows	
Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested solid	70 & 5%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 gauge.

	Doz.
5-inch	$1 15
6-inch	1 25
7-inch	1 75
Special Corrugated	
6-inch	$1 00
7-inch	1 60
Adjustable—Uniform Blue	
"Milcor" No. 28 Gauge. Uniform Blue.	
5-inch	$1.65
6-inch	1 75
7-inch	2 40

WOOD FACES—50% off list.

FENCE

726-6-12½	(100 rods) $29 02
1048-6-14½	(100 rods) 44 03

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	40-10-5%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Otto Berns Co.

East of west boundary line of Province of Manitoba Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma Amarillo, San Angelo and Laredo, Texas 65%

West of above boundary 61%

Clayton & Lambert's

East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Amarillo, San Angelo and Laredo, Texas 52%

West of above boundary line 48%

Geo. W. Dieser Mfg. Co. — No.

No. 62 Gasolene Torch, 1 qt.	$ 5 50
No. 0350, Kerosene, or Gasolene Torch, 1 qt.	7 50
No. 10 Tinners' Furn. Square tank, 1 gal.	12 00
No. 15 Tinners' Furn. Round tank, 1 gal.	12 00
No. 21 Gas Soldering Furnace	3 00
No. 110 Automatic Gas Soldering Furnace	10 50

Double Blast Mfg. Co.

Gasolene, Nos. 35 and 36 80%

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis 30% (Extra Disct. for large quantities)

Chas. A. Hones, Inc.

Buzzer No. 1	$ 9 00
Buzzer No. 2	12 00
Buzzer No. 22	12 50
Buzzer No. 42	15 00
Buzzer No. 43	19 00

GALVANIZED WARE

Pails (Galv. after made),	
10-qt.	$2 20
12-qt.	$2 50

GLASS

Single Strength, A, 25-in. bracket	35%
Single Strength, A, 24 to 40-in. bracket	33%
Single Strength A, all other brackets	31%
Double Strength A, all sizes	33%
Tubs (Galv. after made),	
No. 1	$6 50
No. 2	7 20

HANGERS

Conductor Pipe	
Milcor Perfection Wire	45%
Eaves Trough	
Milcor Eclipse Wire	15%
Milcor Triplex Wire	10%
Milcor Milwaukee Extension	10%
Milcor Steel (gav. after forming) List plus	12½%
Milcor Selflock E. T. Wire, List plus	50%

HOOKS

Sea	
V. & B. No. 1, each	$0 30
Conductor	
Milcor "Direct Drive" Wrought Iron for wood or brick	15%
Hay	
V. & B. No. 1, each	$0 30

HUMIDIFIERS

"Front-Rank," Automatic	
In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover	
Coppered, per gro.	$6 00
Alaska, per gro.	4 75

MALLETS

Tinners'	
Hickory, per doz.	$3 20

MITRES

Galvanized steel mitres, and caps, end pieces, outlets	30%
Milcor	
Galv. one piece stamped	40%

NAILS

Cut Steel	$4 25
Cut Iron	4 25
Wire	
Common	$ 15
Cement Coated	2 90

(Continued on page 44)

ADVERTISERS' INDEX

The dash (—) indicates that the advertisement runs on a regular schedule but does not appear in this issue.

Markets—Continued from page 42

NETTING, POULTRY

Galvanized before weaving 45-10%
Galvanized after weaving.. 45%

PASTE

Asbestos Dry Paste:

200-lb.	barrel.....	$15 00
100-lb.	barrel.....	8 00
25-lb.	pail.....	3 25
10-lb.	bag.....	1 00
5-lb.	bag.....	55
2½-lb.	cartons	30

PIPE

Conductor
Cor. Rd., Plain Rd or Sq.
"Interlock" Galvanized
Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%
"Milcor" "Titelock" Uniform

Blue Stove

28 gauge,	5 inch U. C. nested	11 00
28 gauge,	6 inch U. C. nested	12 00
28 gauge,	7 inch U. C. nested	14 00
30 gauge,	5 inch U. C. nested	10 00
30 gauge,	6 inch U. C. nested	10 50
30 gauge,	7 inch U. C. nested	12 00

T-Joint Made up
6-inch, 28 ga.....per 100 32 50

Furnace Pipe
Double Wall Pipe and Pipe Fittings 50%
Single Wall Pipe, Round Iron Pipe Galvanized....50%
Galvanized and Black Fittings 50%
Milcor Galvanized Pipe and Fittings.....50%

Lead
Per 100 lbs.....$12 50

POKERS, STOVE

Wr't Steel, str't or bent, ...per doz. $0 75
Nickel Plated, coil handles, ...per doz. 1 10

POKERS, FURNACE

Each $0 50

PULLEYS

Furnace Tackle....per doz. $0 60
per gross 6 00
Furnace Screw (encased) .....per doz. 75

Ventilating Register

Per gross	9 00
Small, per pair.....	30
Large, per pair.....	50

PUTTY

Commercial Putty, 100-lb. kits $3 40

QUADRANTS

Malleable Iron Damper.....10%

REDUCERS—Ovel Stove Pipe

	Per doz.
7—6, 1 doz. in carton.....	$2 00

BASEBOARD REGISTERS

Excelsior 50%

FLOOR REGISTERS AND BORDERS

Cast Iron 20%
Steel and Semi-Steel.....40%
Baseboard 40%
Adjustable Ceiling Ventilators 40%

Register Faces—Cast and Steel
Japanned, Bronzed and Plated, 4x8 to 14x14.....40%
Large Register Faces—Cast, 14x14 to 38x42 .....60%
Large Register Faces—Steel, 14x14 to 38x42 .....65%

RIDGE ROLL

Milcor
Galv., Plain Ridge Roll, b'did 75-10-5%
Galv., Plain Ridge Roll, crated 75-10%
Globe Finials for Ridge Roll..50%

ROOFING

	Per Square
Best grade, slate surf. prep'd	$2 30
Best talc surfaced.....	2 60
Medium talc surfaced.....	2 00
Light talc surfaced.....	1 30
Red Rosin Sheeting, per ton	57 00

SCREWS

Sheet Metal

No. 7, ½x½, per gross...	$0 52
No. 10, ¾x3/16, per gross..	63
No. 14, ½x¾, per gross...	83

SHEARS, TINNERS' & MACHINISTS'

Viking $33 00

Lennox Throatless
No. 18 .....35%
Shear blades 10%
(f. o. b. Marshalltown, Iowa.)

Peerless Steel Squaring
Foot Power
No. 1—30", 18 ga. cap.....15%
No. 2—36", 18 ga. cap.....15%
No. 4—52", 18 ga. cap.....15%
No. 10—120", 22 ga. cap...15%
No. 4A—52", 16 ga. cap...15%

Cast Iron Foot Power
No. 01—30", 18 ga. cap....15%

Power Drives
No. 100 Series, 2 Shaft Drive.)
No. 142—42", 18 ga. cap...15%
(No. 200 Series, 2 Shaft Underneath Drive.)
No. 242—42", 14 ga. cap...15%
(No. 300 Series, 2 Shaft Underneath Drive.)
No. 342—42", 10 ga. cap...15%
No. 372—72", 10 ga. cap...15%
(No. 500 Series, 2 Shaft Underneath Drive.)
No. 596—96", 10 ga. cap..15%
(No. 600 Series, 2 Shaft Underneath Drive.)
No. 6120—120", 3/16" cap..15%

SHOES

Milcor
Galv. Std. Gauge, Plain or corg. round flat crimp..65%
26 gauge round flat crimp..40%
24 gauge round flat crimp..10%
Conductor 65%

SNIPS, TINNERS'

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES

Steel and Iron.....Net
(Add for bluing, $3 per doz. net.)
Mitre .....Net
Try .....Net
Try and Bevel.....Net
Try and Mitre.....Net
Fox's .....per doz. $6 00
Winterbottom's 10%

STOPPERS, FLUE

Common .....per doz. $1 10
Gem, No. 1.....per doz. 1 10
Gem, flat, No. 3....per doz. 1 00

VENTILATORS .. ...

Standard .....30 to 40%

WIRE

Plain annealed wire, No. 8 per 100 lbs. $3 00
Galvanized barb wire, per 100 lbs. 3 90
Wire cloth—Black painted, 12-mesh, per 100 sq. ft.... 2 10
Cattle Wire—galvanized catch weight spool, per 100 lbs. 3 85
Galvanized Hog Wire, 80 rod spool, per spool..... 3 30
Galvanized plain wire, No. 9, per 100 lbs. 3 50
Stove Pipe, per stone..... 1 10

WRINGERS

No. 790,	Guarantee	per doz.	$55 00
No. 770,	Bicycle	per doz.	52 50
No. 670,	Domestic	per doz.	48 50
No. 110,	Brighton	per doz.	42 50
No. 750,	Guarantee	per doz.	55 50
No. 740,	Bicycle	per doz.	52 50
No. 22,	pioneer	per doz.	29 00
No. 2,	Superb	per doz.	29 00

Made in nine sizes

FAMOUS SINCE 1819—

Over one hundred years of tool making experience is built into each and every PEXTO Snip. The line is very complete and consists of every practical style and size. Material is the best, the finish is durable and they are fully guaranteed.

Write for catalogue No. 25A showing complete line of Sheet Metal Working Machines and Tools.

THE PECK, STOW & WILCOX CO.

SOUTHINGTON, CONN., U. S. A.

CHICAGO STEEL SLITTING SHEAR

LIGHT—POWERFUL DURABLE

Capacity 10 gauge sheets
Any Length or Width
Flat Bars 3/16x2"
Weight 22 pounds

Price $12.50 Net
F. O. B. Chicago

Made of pressed steel and equipped with hold-down. Blades of highest grade crucible steel. Most indispensable high grade shears made. Equal to other shears selling at over twice the price. *ORDER YOURS TODAY.*

DREIS & KRUMP MFG. CO., 7404 Loomis St., Chicago

NO. 5 JR. PUNCH

Capacity ¼-inch through 16 gauge

Weight	2¼ pounds
Punch in center of	3 inches
Length over all	8¼ inches
Height of Gap	½-inch

Tool shipped complete with 3 sets of Punches and Dies, ⅜-inch, 3 16-inch, ¼-inch.

WRITE FOR PRICES

93 Forbes Street — **WHITNEY METAL TOOL CO.** ROCKFORD, ILLINOIS — 93 Forbes Street

---

Save Time And Money

Cut all Curves and Irregular outlines with a Ryerson Serpentine Shear.

Cuts sheets any width or length. Leaves the material smooth and clean —no "crimping."

Low in price.

Write for the facts. Ask for Bulletin 13251.

Joseph T. Ryerson & Son, Inc.

Chicago, Milwaukee, New York, Buffalo, St. Louis, Detroit, Cincinnati

RYERSON MACHINERY

BUYERS' DIRECTORY

Asbestos Paper.
Sall Mountain Co., Chicago, Ill.

Asbestos Products.
Sall Mountain Co., Chicago, Ill.

Bale Ties.
American Steel & Wire Co., Chicago, Ill.

Bolts—Stove.
Kirk-Latty Mfg. Co., Cleveland, Ohio

Brakes—Bending.
Dreis & Krump Mfg. Co., Chicago, Ill.

Brakes—Cornice.
Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper.
Copper & Brass Research Association, New York
Hussey & Co., C. G., Pittsburgh, Pa.
Merchant & Evans Co., Philadelphia, Pa.

Cans—Garbage.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable.
Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal.
Friedley-Voshardt Co., Chicago, Ill.
Hopson & Co., W. C., Grand Rapids, Mich.
Milwaukee Corrugating Co., Milwaukee, Wis.
Wheeling Corrugating Co., Wheeling, W. Va.

Chaplets.
Fanner Mfg. Co., Cleveland, Ohio

Chain—Sash.
Parker-Kalon Corp., New York, N. Y.

Chimney Tops
Standard Ventilator Co., Lewisburg, Pa.

Cleaners—Furnace.
Sturtevant, Boston, Mass.

Chimney Tops.
Iwan Bros., South Bend, Ind.

Cleaners—Suction.
Brown, Wm. R. Buffalo, N. Y.
Sturtevant, Boston, Mass.

Clinker Tongs.
Federal Mfg. Co., Holland, Mich.

Copper.
Copper & Brass Research Association, New York
Hussey & Co., C. G., Pittsburgh, Pa.

Cornices.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.

Cut-Offs—Rain Water
Allred Mfg. Co., Indianapolis, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis.

Damper Clips
S. M. Howes Co., Charlestown, Mass.

Diffuser—Air Duct.
Aeolus-Dickinson Co., Chicago, Ill.

Doors—Metal.
David Lupton's Sons Co., Philadelphia, Pa.

Eaves Trough.
Barnes Zinc Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Berger Co., L. D., Philadelphia, Pa.
Clark-Smith Hardware Co., Peoria, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
New Jersey Zinc Sales Co., The, New York, N. Y.
Wheeling Corrugating Co., Wheeling, W. Va.

Elbows and Shoes—Conductor.
American Rolling Mill Co., Middletown, Ohio
Barnes Zinc Products Co., Chicago, Ill.
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Double-Duty Elbow Co., Aurora, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.

Enamel Wire.
Lalance & Grosjean Mfg. Co., Chicago, Ill.

Wood Faces—Cold Air.
American Wood Register Co., Plymouth, Ind.
Eaglesfield Ventilator Co., Indianapolis, Ind.
Marsh Lumber Co., Dover, Ohio
Milwaukee Corrugating Co., Milwaukee, Wis.

Fences.
American Steel & Wire Co., Chicago, Ill.

Flue Thimbles.
Milwaukee Corrugating Co., Milwaukee, Wis.

Furnace Brushes.
Hardware Specialty Co., Fort Wayne, Ind.

Furnace Cement—Asbestos.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.
Pecora Paint Co., Philadelphia, Pa.

Furnace Rings.
Independent Register and Mfg. Co., Cleveland, Ohio
Milwaukee Corrugating Co., Milwaukee, Wis.
Walworth Run Fdy. Co., Cleveland, Ohio

Furnace Fans.
Heating Systems & Supply Co., Chicago, Ill.
Warm Air Furnace Fan Co., The Cleveland, Ohio

Furnaces—Warm Air.
American Furnace Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Brillion Iron Works, Brillion, Wis.
Chicago Furnace Supply Co., Chicago, Ill.
Cleveland Cooperative Stove Co., Cleveland, Ohio
Col-Burn Heater Co., Chicago, Ill.
Cox Stove Co., Abram, Peoria, Ill.
Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Heater Co., Monroe, Mich.
Forest City Fdy. & Mfg. Co., Cleveland, Ohio
Fox Furnace Co., Elyria, Ohio
Gray & Dudley Co., Nashville, Tenn.
Heating Systems & Supply Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hero Furnace Co., Sycamore, Ill.
Hess-Snyder Co., Massillon, Ohio
Homer Furnace Co., Coldwater, Mich.
International Heater Co., Utica, N. Y.
Kruse Co., Indianapolis, Ind.
Lamneck Co., W. E., Columbus, Ohio
Langenberg Mfg. Co., St. Louis, Mo
Lennox Furnace Co., Marshalltown, Ia.; Syracuse, N. Y.
Liberty Foundry Co., St. Louis, Mo.
Marshalltown Heater Co., Marshalltown, Iowa
May-Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Monitor Furnace Co., Cincinnati, Ohio
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Mueller Furnace Co., S. J., Milwaukee, Wis.
Oakland Foundry Co., Belleville Ill.
Peninsular Stove Co., Detroit, Mich.
Richardson & Boynton Co., New York, N. Y.
Robinson Furnace Co., Chicago, Ill.
Rudy Furnace Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio
Schill Bros. Co., Crestline, Ohio
Schwab & Sons Co., R. J., Milwaukee, Wis.
Security Stove & Mfg. Co., Kansas City, Mo.
Standard Foundry & Mfg. Co., DeKalb, Ill.
Standard Furnace & Supply Co., Omaha, Neb.
St. Clair Foundry Corporation, Belleville, Ill.
St. Louis Heating Co., St. Louis, Mo.
Success Heater Mfg. Co., Des Moines, Iowa
Thatcher Co., Chicago, Ill.
Utica Heater Co., Utica, N. Y.
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio
Williamson Heater Co., Cincinnati, Ohio

Garages—Metal.
Milwaukee Corrugating Co., Milwaukee, Wis.

Glass—Wire.
David Lupton's Sons Co., Philadelphia, Pa.
Williams Hardware Co., Streator, Ill.

Grilles.
Hart & Cooley Co., New Britain, Conn.
Independent Register & Mfg. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Handles—Boiler.
Berger Bros. Co., Philadelphia, Pa.

Hangers—Eaves Trough.
Berger Co., L. D., Philadelphia, Pa.
Hopson & Co., W. C., Grand Rapids, Mich.
Milwaukee Corrugating Co., Milwaukee, Wis.

Heaters—Cabinet.
Fox Furnace Co., Elyria, Ohio
Gray & Dudley Co., Nashville, Tenn.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Peninsular Stove Co., Detroit, Mich.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room.
Floral City Heater Co., Monroe, Mich.
Hero Furnace Co., Sycamore, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Standard Furnace & Supply Co., Omaha, Neb.
Waterman-Waterbury Co., Minneapolis, Minn.

Hooks—Conductor
Berger Co., L. D., Philadelphia, Pa.

Humidifiers
National Air Moistener Co., Minneapolis, Minn.

Jobbers—Hardware.
Clark-Smith Hardware Co., Peoria, Ill.

Kitchen Utensils.
Lalance & Grosjean Mfg. Co., Chicago, Ill.

Lath—Expanded Metal.
Milwaukee Corrugating Co., Milwaukee, Wis.

Machines—Crimping.
Bertsch & Co., Cambridge City, Ind.

Machinery—Culvert.
Bertsch & Co., Cambridge City, Ind.

Machines—Tinsmiths'.
Bertsch & Co., Cambridge City, Ind.
Chicago Elbow Machine Co., Oak Park, Ill.
Dreis & Krump Mfg. Co., Chicago, Ill.
Great Lakes Supply Co., South Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Unishear Co., The, New York, N.Y.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Metals—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Miters.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis

Miters—Eaves Trough.
Braden Mfg. Co., Terre Haute, Ind
David Lupton's Sons Co., Philadelphia, Pa
Milwaukee Corrugating Co., Milwaukee, Wis

Nails—Hardened Masonry.
Parker-Kalon Co., New York, N. Y

Nails—Slating.
Hussey & Co., C. G., Pittsburgh, Pa

Nails—Wire.
American Steel & Wire Co., Chicago, Ill

Oil Burners.
Security Stove & Mfg. Co., Kansas City, Mo

Ornaments—Sheet Metal.
Friedley-Voshardt Co., Chicago, Ill
Gerock Bros. Mfg. Co., St. Louis, Mo
Milwaukee Corrugating Co., Milwaukee, Wis

Paint.
Connors Paint Mfg. Co., Wm., Troy, N. Y
Pecora Paint Co., Philadelphia, Pa

Patterns—Furnace & Stove.
Cleveland Castings Pattern Co., Cleveland, Ohio
Quincy Pattern Co., Quincy, Ill
Vedder Pattern Works, Troy, N. Y

Pipe and Fittings—Furnace.
Chicago Furnace Supply Co., Chicago, Ill
Excelsior Steel Furnace Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lamneck Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis
Mueller Furnace Co., L. J., Milwaukee, Wis
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Robinson Furnace Co., Chicago, Ill
Standard Furnace & Supply Co., Omaha, Neb

Pipe and Fittings—Stove.
Allred Mfg. Co., Indianapolis, Ind
Excelsior Steel Furnace Co., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill
Milwaukee Corrugating Co., Milwaukee, Wis

Pipe—Conductor.
Barnes Zinc Products Co., Chicago, Ill
Berger Bros. Co., Philadelphia, Pa
Burton Co., W. J., Detroit, Mich
Clark-Smith Hdw. Co., Peoria, Ill
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Friedley-Voshardt Co., Chicago, Ill
Hussey & Co., C. G., Pittsburgh, Pa.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
New Jersey Zinc Sales Co., The, New York, N. Y.
Wheeling Corrugating Co., Wheeling, W. Va.

Say you saw it in AMERICAN ARTISAN—Thank you!

BUYERS' DIRECTORY

Posts—Steel Fence.
American Steel & Wire Co., Chicago, Ill.

Punches.
Bertsch & Co., Cambridge City, Ind.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Punches—Combination Bench and Hand.
Parker-Kalon Corp., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Punches—Hand.
Whitney Metal Tool Co., Rockford, Ill.
Whitney Mfg. Co., W. A., Rockford, Ill.

Putty—Stove
Connors Paint Mfg. Co., Wm. Troy, N. Y.
Pecora Paint Co., Philadelphia, Pa.

Quadrants—Damper
Parker-Kalon Corp., New York, N. Y.

Radio—Sets and Supplies.
Williams Hardware Co., Streator, Ill.

Ranges—Combination Gas & Coal
Cox Stove Co., Abram, Philadelphia-Chicago
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Ranges—Gas.
Cox Stove Co., Abram, Philadelphia-Chicago
Quick Meal Stove Co., St. Louis, Mo.
Gray & Dudley Co., Nashville, Tenn.

Register Shields
Hardware Specialty Co., Fort Wayne, Ind.

Registers—Warm Air.
American Wood Register Co., Plymouth, Ind.
Chicago Furnace Supply Co., Chicago, Ill.
Eaglesfield Ventilator Co., Indianapolis, Ind.
Excelsior Steel Furnace Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register and Mfg. Co., Cleveland, Ohio
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Robinson Furnace Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Standard Furnace & Supply Co., Omaha, Neb.
Stearns Register Co., Detroit, Mich.
Tuttle & Bailey Mfg. Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
Walworth Run Fdy. Co., Cleveland, Ohio

Registers—Wood.
American Wood Register Co., Plymouth, Ind.
Chicago Furnace Supply Co., Chicago, Ill.
Eaglesfield Ventilator Co., Indianapolis, Ind.

Regulators—Damper.
Parker-Kalon Corp., New York, N. Y.

Repairs—Stove and Furnace.
Hessler Co., H. E., Syracuse, N. Y.
Northwestern Stove Repair Co., Chicago, Ill.

Ridging.
American Rolling Mill Co., Middletown, Ohio
David Lupton's Sons Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.

Rivets—Stove.
Kirk-Latty Mfg. Co., Cleveland, Ohio

Roasters.
Lalance & Grosjean Mfg. Co., Chicago, Ill.

Rods—Stove.
Kirk-Latty Mfg. Co., Cleveland, Ohio

Rolls—Forming.
Bertsch & Co., Cambridge City, Ind.

Roofing Cement
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Pecora Paint Co., Philadelphia, Pa.

Roof—Flashing.
Hessler Co., H. E., Syracuse, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Roofing—Iron and Steel.
American Rolling Mill Co., Middletown, Ohio
Cortright Metal Roofing Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Enameling and Stamping Co., Granite City Steel Works, Granite City, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Wheeling Corrugating Co., Wheeling, W. Va.

Roofing—Tin.
Taylor Co., N. & G., Philadelphia, Pa.

Roofing—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Rubbish Burners.
Hart & Cooley Co., New Britain, Conn.

Sal—Ammoniac.
Specials Chemicals Co., Highland Park, Ill.

Schools—Sheet Metal Pattern Drafting.
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating.
Northern Institute, Cleveland, Ohio

Screws—Sheet Metal
Parker-Kalon Corp., New York, N. Y.

Screens—Perforated Metal.
Harrington & King Perforating Co., Chicago

Shears—Hand and Power.
Double-Duty Elbow Co., Aurora, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Unishear Co., The, New York
Viking Shear Co., Erie, Pa.

Sheets—Black and Galvanized.
American Rolling Mill Co., Middletown, Ohio
Davis Co., Inc., C. S., Chicago, Ill.
Granite City Steel Works, Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Enameling and Stamping Co., Granite City, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Sheets—Iron
American Rolling Mill Co., Middletown, Ohio
Merchant & Evans Co., Philadelphia, Pa.

Sheets—Tin.
Davis Co., Inc., C. S., Chicago, Ill.
Granite City Steel Works, Granite City, Ill.
Merchant & Evans Co., Philadelphia, Pa.
National Enameling and Stamping Co., Granite City, Ill.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Shingles and Tiles—Metal.
Cortright Metal Roofing Co., Philadelphia, Pa.
Hopson & Co., W. C., Grand Rapids, Mich.
Milwaukee Corrugating Co., Milwaukee, Wis.
Wheeling Corrugating Co., Wheeling, W. Va.

Shingles—Asphalt.
Sail Mountain Co., Chicago, Ill.

Shingles—Zinc.
Milwaukee Corrugating Co., Milwaukee, Wis.

Sifters—Ash.
Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights.
David Lupton's Sons Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.

Smoke Pipe—Cast Iron.
Heating Systems & Supply Co., Chicago, Ill.

Snips
Peck, Stow & Wilcox Co., Southington, Conn.

Solder.
Chicago Solder Co., Chicago, Ill.
Double-Duty Elbow Co., Aurora, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
S. L. Products Co., Council Bluffs, Iowa

Solder—Aluminum
S. L. Products Co., Council Bluffs, Iowa

Soldering Furnaces.
Berns Co., Otto, Newark, N. J.
Burgess Soldering Furnace Co., Columbus, Ohio
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., G. W., Chicago, Ill.
Double Blast Mfg. Co., North Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Thermo Gas Furnace Co., Chicago, Ill.

Soldering Supplies.
Double-Duty Elbow Co., Aurora, Ill.
Special Chemicals Co., Highland Park, Ill.

Specialties—Hardware.
Diener Mfg. Co., G. W., Chicago, Ill.
Hessler Co., H. E., Syracuse, N. Y.

Stars—Hard Iron Cleaning.
Fanner Mfg. Co., Cleveland, Ohio

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.

Steel Stampings.
American Tube & Stamping Co., Bridgeport, Conn.

Stove Pipe Reducers.
Allred Mfg. Co., Indianapolis, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis.

Stoves—Camp.
Quick Meal Stove Co., St. Louis, Mo.

Stoves—Gasoline and Oil.
Quick Meal Stove Co., St. Louis, Mo.
Reps Heater Co., Clyde, Ohio

Stoves and Ranges.
Cleveland Cooperative Stove Co., Cleveland, Ohio
Cox Stove Co., Abram, Philadelphia, Pa.
Gray & Dudley Co., Nashville, Tenn.
Oakland Foundry Co., Belleville, Ill.
Peninsular Stove Co., Detroit, Mich.
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Tacks, Staples, Spikes.
American Steel & Wire Co. Chicago, Ill

Tile Cement—Elastic.
Pecora Paint Co., Philadelphia, Pa.

Tinplate.
Davis Co., Inc., C. S., Chicago, Ill.
Granite City Steel Works, Granite City, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Enameling and Stamping Co., Granite City, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tin—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Tools—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Chicago Elbow Machine Co., Oak Park, Ill.
Dreis & Krump Mfg. Co., Chicago, Ill.
Great Lakes Supply Co., South Chicago, Ill.
Hopson & Co., W. C., Grand Rapids, Mich.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Unishear Co., The, New York, N. Y.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Torches
Berns Co., Otto, Newark, N. J.
Burgess Soldering Furnace Co., Columbus, Ohio
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., G. W., Chicago, Ill.
Double Blast Mfg. Co., North Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.

Trade Extension
Copper & Brass Research Association, New York, N. Y.
Sheet Steel Trade Extension Committee, Pittsburgh, Pa.

Trimmings—Stove.
Fanner Mfg. Co., Cleveland, Ohio

Ventilators.
Arex Company, Chicago, Ill.
Aeolus Dickinson Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Hopson & Co., W. C., Grand Rapids, Mich.
David Lupton's Sons Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Royal Ventilator Co., Philadelphia, Pa.
Standard Ventilator Co., Lewisburg, Pa.
Sturtevant Co., Boston, Mass.

Ventilators—Ceiling.
Eaglesfield Ventilator Co., Indianapolis, Ind.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York

Windows—Steel.
David Lupton's Sons Co., Philadelphia, Pa.

Wire—Electrical.
American Steel & Wire Co., Chicago, Ill.

Wire Hoops
American Steel & Wire Co., Chicago, Ill.

Wire Rope.
American Steel & Wire Co., Chicago, Ill.

Wrenches.
Coes Wrench Co., Worcester, Mass. Peru, Ill.

Zinc.
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Zinc Co., The, New York, N. Y.

WANTS AND SALES

For paid yearly subscribers, AMERICAN ARTISAN AND HARDWARE RECORD will insert under this head advertisements of not more than fifty words WITHOUT CHARGE. Employers wishing to secure employes, parties desiring to purchase or sell business, secure partners, or to exchange, etc., will find that these pages offer excellent opportunities to satisfy their wants. Clerks and tinsmiths looking for situations will find it to their advantage to use these columns. Those who respond to these announcements please mention that they "READ THE ADVERTISEMENT IN AMERICAN ARTISAN AND HARDWARE RECORD."

BUSINESS CHANCES

LIGHTNING RODS—Dealers who are selling Lightning Protection will make money by writing us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable is endorsed by the Mutual Insurance Companies and hundreds of reliable dealers. Write today for samples and prices. L. K. DIDDIE CO., Marshfield, Wis.

For Sale—Plumbing, furnace and sheet metal business. Central Western Illinois city of 3,500; growing fast; on Ocean to Ocean hwy.; water works and sewer just completed; big demand for plumbing and goods; 35 warm air furnaces will be sold, have 15 assured. Complete outfit of plumbers' tools and tinners' tools, nothing to be bought; business established. Licensed master plumber and furnace expert; will stay and draw wages only when at work; well acquainted with trade; owns home. Brick room located on hardwood 20x70, cement floor in work room, show room very light; rent, phone, light and heat $18.00 per month. Will invoice about $1,500; $1,000 cash, balance six months, secured. Freight reasonable, from St. Louis by river 12 hours, Chicago 48 hours; not necessary to carry large stock. People prosperous; six churches, splendid schools, factories, beautiful city, house rents reasonable. Must go west, real estate investments need attention. Address B-59, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-3t

For Sale — Combination plumbing and tinshop in one of the prettiest towns of 3,500 population in Colorado. On paved highway to Denver, at the foot of the mountains, on the main highway to Denver mountain parks. Ideal climate summer and winter. Reason for selling this dandy busy shop, I am going into the manufacturing business. Last year was considered a dull year, but this shop averaged better than $1,000 per month. Plenty of work for plumbers and tinners the year around. Machines and tools practically new. A dandy equipment, including 1925 Ford ton truck. Shop is on main business street. Fine location and good opportunity for a hardware store if desired. Only one other shop in town. Stock, tools and machines will invoice about $2,750. Better act quick if you want a dandy, clean, up-to-date paying business in a nice clean town with paved streets. New $200,000 high school. Address B-67, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-3t

For Sale—Hardware and grocery store. Double room; good Illinois town. Business has been established many years and wish to retire. Good steady income. Good building. About $9,000 stock and equipment complete, $14,000. Reasonable terms. Mielke Brothers, Danville, Illinois. 17-3t

For Sale or Lease—Best equipped shop in Casper, Wyoming. Other business requires my attention. Deal must be closed by May 1. For particulars write Box 150, Casper, Wyoming. 17-3t

BUSINESS CHANCES

For Sale—Only plumbing shop in town of 1400. Children finishing high school. Wishes to move to college town. Will sacrifice for quick sale. Plumbing, heating, sheet metal, windmills and engines. Cleared $3,000 last year. Stock about $5,000. Will sell stock and building for $7,000. A real chance for a live man. Address B-56, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

For Sale—A hardware business; positively the biggest opportunity and choicest location in northern Illinois. Community growing faster than a Florida boom. Owner wants to devote more time to his rapidly growing plumbing business. Invoice about $15,000. Terms. Address B-57, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

For Sale—A sheet metal shop and furnace works located in Wisconsin. Long established and good location. Selling and installing about 200 furnaces per year. Ill health reason for selling. Will consider property in exchange located in Arkansas or southern Missouri. Address B-75, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-6t

For Sale—Old established sheet metal and stove repair business, including 8-ft. cornice brake, roofing tools, squaring shears, etc., used Ford truck, also ladders. Doing good business. Reason for selling, must settle an estate. Address B-73, care of AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

For Sale—Must sell at once; well established sheet metal business and stock, cooperating with large hardware company in adjoining building. Rent on 2,000 feet floor space, tools and fixtures, $28.00. Good reason for selling. Will show profit to interested party. Thatcher Furnace Agency, Address Darling & Saxton, Waupun, Wisconsin. 17-3t

For Sale—Sheet metal shop in northwestern Iowa. Full set tools. Good established business in town of 1500. No competition. Fine school facilities. Good territory. Excellent opportunity for a tinner and plumber combined. Address B-77, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 18-3t.

For Sale—On account of other interests taking all my time, will sell well established going sheet metal and furnace business in prosperous Wisconsin city of 10,000 population. Liberal terms and full co-operation. Address B-65, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-3t

Wanted—To buy a good clean hardware store doing an active business in a town of 1,500 or larger. State amount of business done last year and the price you expect in answer to this ad. Address B-69, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

For Sale—A well equipped tinshop, located in a thriving little city near several lakes in southern Wisconsin. A snap for a good tinner who is a hustler. Address B-70, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

HELP WANTED

WANTED—2 first class tinners and skylight makers. Plenty of work all the year around. Job to sober and competent workman at good pay. Also can now use a good working foreman who can estimate and take charge of business when I am away. Delightful climate, never warmer than 96, cool breezes from the bay or gulf most of the time. State age. Wire or address, Box 1936, St. Petersburg, Florida. 18-3t.

Wanted—A first class sheet metal worker; experienced in cafeteria and kitchen equipment. Steady job for competent man. Address Omaha Fixture and Supply Co., 1101 Douglas St., Omaha, Nebraska. 16-3t

Wanted—Tinner and handy man. $20 per week with two furnished rooms. Married man preferred. Address C. Eckhard, 512 E. Broadway, Alton, Illinois. 15-3t

Wanted—At once, tinner that understands furnace work and all kinds of job work. Steady job the year around for right man. Wages $40.00 per week. Address J. H. Barnett, Dodge City, Kansas. 18-3t.

SITUATION WANTED

Situation Wanted—Young man with 16 years' experience in plumbing, heating and tinning. Would like steady job the year around with some reliable firm. No job too big and none too small. Have Iowa and Illinois plumbers license. Can come by June 15th or sooner if necessary. Please state particulars when answering as to wages, hours if steady work. Get in touch with me at once if you want a reliable man. Can read blue prints and run a shop. Address B-60, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-3t.

Situation Wanted—By tinner and furnace man who can do plumbing. Twenty years' experience; cut own patterns. Have had experience with hardware. Wages and location not considered; I am married and wish steady position. Can come at once. Would like to hear from someone looking for a good man. Address J. R. Alexander, 313 Bridge St., Crookston, Minnesota. 16-3t

Situation Wanted—By a good all around plumber, tinner and steamfitter, also good on repair work. Am middle age, married and want steady position the year around. Am employed at present but want to make a change. Can come on short notice. Please state wages. Address B-71, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

Situation Wanted — By a first-class sheet metal worker. Am able to lay out my own work. Can do inside and outside work. Am sober and reliable. Steady position. Have had 15 years' experience. Kindly state wages, hours and class of work you do in first letter. Can come at once. Address G. W. Mills, 217 East Dubail Avenue, South Bend, Indiana. 15-3t

Situation Wanted — By sheet metal worker and furnace man, stove repairing. Have had four years' experience in hardware store and selling farm machinery. Prefer western Montana, northern Idaho or Washington. Married. 44 years of age. Can start after the first week in May. Address Geo. W. Burton, P. O. Box 127, Anaconda, Montana. 15-3t

Situation Wanted—In central western states by competent plumber, fitter and furnace man. Middle age; have family. Have wide experience in the trades. Spent several years in some of the large eastern shops. Am strictly temperate. Can handle the business in capacity of foreman on a paying basis. Address Box 348, Saco, Montana. 17-3t

Situation Wanted — By a first-class sheet metal worker. Am able to lay out all kinds of work. Am sober, steady and reliable. Kindly state wages and hours you work in letter. Address B-74, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

Situation Wanted—By first-class sheet metal worker and plumber. Furnace installer and radiator repairing. All general repairing. Would like position where there is plenty of work. Address B-68, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

Wanted—Steady position as plumber; also handy on steam or hot water heating. Also good gas engine mechanic. Married. Can furnish best of references. Address B-76, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 18-3t.

Situation Wanted—By a practical all-around sheet metal worker with 25 years' experience. Can lay out own work and erect same. State wages. Position must be steady. Address B-78, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 18-3t.

Situation Wanted—By young man experienced in furnace factory, is learning the sheet metal trade, and would like to get in shop doing inside and outside work. Address B-54, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 14-3t

SITUATION WANTED

Situation Wanted—By buyer and manager for retail hardware store. Have had 15 years' experience in the retail hardware business; also 15 years' road experience. Address B-46, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

Situation Wanted — By a first-class tinner and furnace man, experienced in all branches of the trade. Wisconsin preferred. Address B-39, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 13-3t.

Situation Wanted—By tinner and furnace installer. Prefer shop that also does radiator repairing. Address Tinner, 426 South Chicago Avenue, Freeport, Illinois. 14-3t

Situation Wanted—By a first-class sheet metal worker. Small town preferred. Address B-53, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 14-3t

TINNERS' TOOLS

Wanted—1 pair of No. 742½ wide gauge roofing seamers to follow 1½ and 1¼ roofing tongs. 1 roofing cleater and nailer No. 997 for wide gauge; 1 No. 542 large turner; 1 No. 540 small turner with 1½ face; 1 No. 550 elbow edging machine with 1½ face; 1 No. 986 skate ripper, also some stakes as follows—No. 949 double seaming with 4 heads; No. 958 teakettle stake with 4 heads. All tools and machines must be in perfect working condition. State what you have, its condition and price. Address Box 216, Saybrook, Illinois. 18-3t.

For Sale—Three turning machines, different sizes; burring machine, bench shears, 30-in. forming rolls, beading machines, grooving machine, two wiring machines, setting down machine, machine for seaming bottoms, several sizes, one bar folder, one pipe folding machine, gutter beader and other small tools. First check for $60 gets them at once. These machines have standards. Address B-64, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

For Sale—8-ft. Chicago steel brake, No. 4, for 18-gauge and lighter iron. Good as new; has not been used enough to scratch the paint but a little. $125.00 buys it. F. o. b. cars. Also 20-inch P. S. & W. adjustable bar folder; good as new; $20. Address B-58, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

Wanted — Set of 30-inch squaring shears. Must be in good shape and a bargain for cash. Address B-66, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-3t

For Sale—Complete set of tinners' and roofers' tools. Part new and all in A-1 condition. Closing out tin shop. A bargain in tinners' tools. Write for price list. Also set of plumber's tools. W. L. Salyers, Carrollton, Ky. 17-3t

For Sale—One Peck Stow Wilcox No. 130 "A" Square Shears in good condition. $30.00. Address Metzger Sheet Metal Works, 144 North Edwards Street, Kalamazoo, Michigan. 14-3t

For Sale — One Peck-Stow-Wilcox 30" square shear in first-class condition and priced reasonable. Address B-72, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 17-3t

For Sale—One set of tinners' tools in good shape. Complete except brake. For information write J. A. Conrad, 860 Vine Street, Beloit, Wisconsin. 15-3t

Wanted—To buy a second hand circular shear in good condition. Address Johnson Heating Co., 3449 South Broadway, Englewood, Colorado. 18-3t.

Wanted—One 10-foot steel brake, one 30-inch or 36-inch adjustable bar folder. Write Pioneer Cornice Works, 150 N. W. 5th St., Miami, Florida. 15-3t

BOOKS

Order your books now with your renewal to AMERICAN ARTISAN. You can save 10 per cent on your total purchase. Subscription to AMERICAN ARTISAN is $3.00 for 2 years. Take advantage of this saving also.

The book, "Home Instruction for Sheet Metal Workers," by William Neubecker, and edited by Frank X. Morio, contains facts that you want to know and know how to use. A practical instruction manual for the apprentice, mechanic and master sheet metal worker, covering the course of instruction given students in the sheet metal department at the New York Trade School. Cutting, forming, preparing full-size details from architects' blueprints, developing patterns and bending on the brake and setting the work together. Chapters on skylight and pitched skylights, stationary and movable louvres, turret sash, gearing, etc. 400 pages, 684 illustrations, bound in cloth, with 15 folding plates bound separately. Price $5.00. Order from the Book Department, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

SPECIAL NOTICES

Special Notices — displayed want ads—are charged at the rate of $3.00 per inch per insertion.

PATENTS

HUBERT E. PECK
Patent Attorney
Barrister Bldg., WASHINGTON, D. C.

WANTED

1—Power driven circle shear and flanger.
1—Set power driven forming rolls, ¼" cap.
1—Any length from 5' 0" to 8' 0".
1—Brake 8' 0" capacity 14 gauge.
1—Hand operated slitting shear, ¼" cap.

All machines must be in a guaranteed condition. State capacity, and manufacturer's name, and place where machines may be inspected. Address L-62, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

FOR SALE

Weatherly's Furnace and Sheet Metal Works in Grand Rapids, Michigan. A good opportunity for somebody. Long established and a good location. Ill. health cause of selling. Address C. S. Weatherly, 949 Cherry Street, S. E., Grand Rapids, Michigan. 14-3t

CAN YOU USE THESE PIPELESS FURNACE GRATINGS

2- 30x30 Cast Duplex OC
3- 40x40 Cast Duplex OC
4- 45x45 Cast Duplex OC

Best offer takes them
Write today to—

JACK STOWELL
14 SOUTH LA SALLE ST.
AURORA, ILLINOIS

SPECIAL NOTICES

SALESMEN WANTED

We are looking for several good, wide-awake salesmen, not necessarily experienced in the furnace business, to represent a thoroughly established furnace line in Minnesota, central Wisconsin and northern Illinois. Please state qualifications and past experience in first letter. Address L-63, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-3t

WANTED

At once, experienced representative to sell a high class and well known line of all kinds of stoves and furnaces in western New York. Address L-59, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 14-3t

WANTED SALESMANAGER

Eastern salesmanager wanted by large Gas Range Manufacturer. Must be in position to do considerable traveling. Salary, bonus and expenses to right party. Apply giving full details. Address L-64, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 16-1t.

FURNACE BUSINESS

FOR SALE—Established 30 years at Grinnell, Iowa. Retail. Death of owner cause of selling. Good opportunity. Small capital required. Shop, garage, dwelling on ground. May be rented. Address Lillie M. Griffith, Executrix, Grinnell, Iowa. 18-2t.

RETAIL FURNACE SALESMAN

Experienced in Old House Business with a thorough knowledge of heating engineering, desires to make a change. Chicago territory only. Capable of founding a furnace and cabinet heater organization. Address L-61, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 15-2t

C. G. HUSSEY & CO.

Rolling Mills and Office,
PITTSBURGH, PA.

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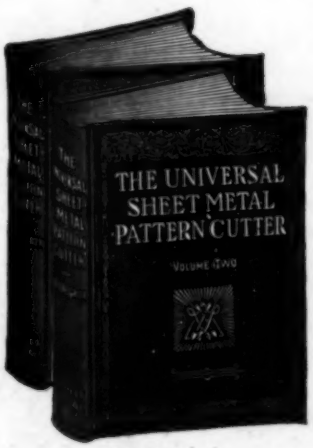

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By Neubecker

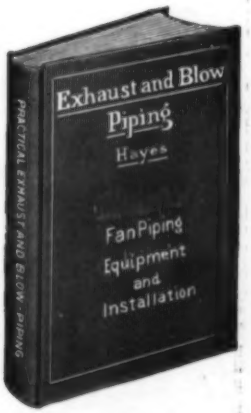
HERE are two books that can't be beat. They are the most practical and useful treatises on the subject.

Work of all the branches of the trade and the broadest scope of details are found—inside and outside work—small jobs and the most complicated are shown, explained and profusely illustrated.

The first volume deals with all types and kinds of inside small and large sheet metal work.

The second volume of this practical work deals with the more advanced branches of sheet metal work, in fact is largely devoted to the architectural end of the business. It consists of 400 double column pages and is illustrated with 711 engravings showing all methods under treatment, as well as perspective views of the subjects of the patterns, and other demonstrations in their finished state. It includes drawing, full sized detailing and lettering, development and construction of sheet metal cornices and skylights, leaders, copings, pediments, circular work, dormer and bay windows, sheet metal ornamentations, electrically illuminated signs, hollow metal windows, frames and fire doors, metal roofing, etc.

The volumes are bound in heavy cloth and each measures 9 x 12 in. Each contains over 380 pages and 680 original drawings. **Price $7.50 each.**



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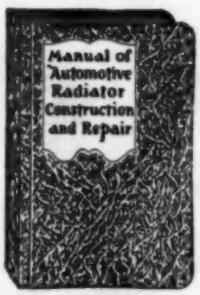
EXHAUST and Blow Piping has had an unusually big demand. A fresh supply is now off the press and is in our hands for immediate delivery. It has an invaluable treatise on the planning, cost, estimation and installation of fan piping in all its branches giving all necessary guidance in fan work blower and separator construction. 159 pages, 5 x 8, 51 figures. Cloth, **$2.00.**



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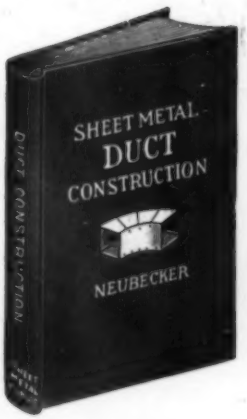
ANYONE interested in Radiator Repairing will find the 185 pages of practical instructions and the 120 illustrations showing actual construction and repairing a big help. In a condensed manner some four to five thousand answers to questions are given. It is thoroughly practical as both authors are men of wide experience in this work. Printed in large, easy to read type. Measures 5¾ x 9 inches. **Price $2.50.**



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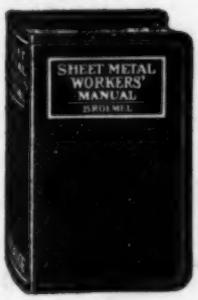

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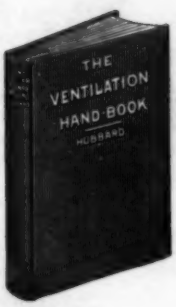

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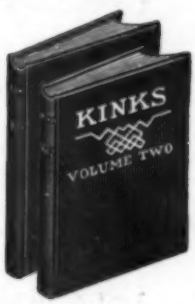

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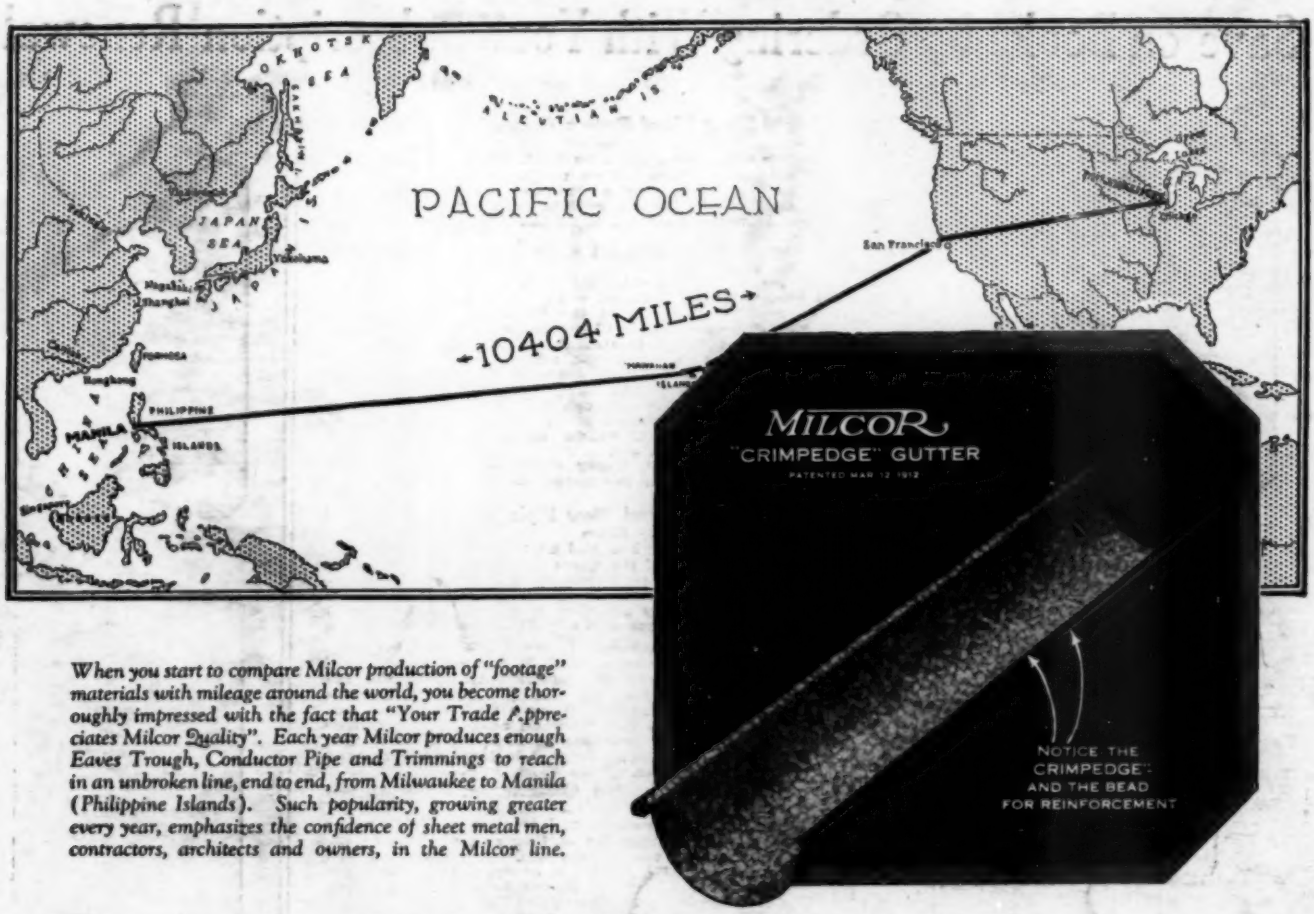

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